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In this issue of the Journal a special emphasis is given to issues related to quality and safety in patient care. The Group has adopted seven safety goals and workshops have been conducted to implement policies related to these goals. We have now joined many others worldwide in a movement to ensure quality and safety for our patients as a prerequisite to care. However, as many have found over the past ten years, issues involving quality and safety are complex ones. Success requires an intrinsic willingness among all health care professionals to change. Teamwork is essential. Champions have to be identified to effect changes in attitudes and practices. A safety culture has to be established and constantly monitored.

Tan Sri Abu Bakar Suleiman addresses some of the basic issues of safety in patient care and his commentary provides us with a framework for initial work in our setting. The following four articles are early examples of work that can be done to address local problems. More sophisticated work will be produced in the future as momentum gathers. We look forward to seeing research in safety and quality as the main thrust in our renewed interest in research and development.

Azizi Haji Omar, FRCP, FAMM
INVITED COMMENTARY

Building A Safety and Quality Culture

Abu Bakar Suleiman*

Medicine and healthcare have made enormous progress as a result of the advances in science and technology over the last century. However, we are faced with major challenges in ensuring that healthcare services are delivered safely and according to the needs and expectations of the patients. The great emphasis on science and technology in the development of modern medicine with the tendency of depersonalising health care services received by patients, had given rise to widespread concern, that an International Consultation on the future direction of Medicine was organized by The Hastings Centre, New York. The report of this Consultation included a reiteration of The Goals of Medicine (refer Fig. 1), which they believe can be a basis for the direction that Medicine should take for the future. They also believe that these Goals can be the basis to guide the development of health research and of medical education.1

While healthcare has made remarkable improvements, the healthcare industry has faced numerous and severe criticisms over alleged shortcomings: the rapidly rising cost of healthcare, with no end in sight, long waiting periods for service; the allegedly high error rate; and even evidence of greed and fraud in some sectors of the industry.2 The concern that healthcare can and should learn from other industries in quality improvement experience led to the National Demonstration Project (NDP) in the USA: the pairing of 21 health care organizations, each of them new to quality improvement, with an equal number of experts on quality control and improvement in other industries who served as mentors. This project was led by Don Berwick from Harvard Medical School, and the report of this project, CURING HEALTH CARE, New Strategies for Quality Improvement, published in 1990, is valuable to those in the healthcare industry who wish to achieve long-lasting success.3

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Fig.1. The Hasting Center Report, The Hastings Center, New York, Nov/Dec 1996

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<th>&quot;The Goals of Medicine: Setting New Priorities&quot;, proposed four goals</th>
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<td>• The prevention of disease and injury and the promotion and maintenance of health</td>
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<td>• The relief of pain and suffering caused by maladies</td>
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<td>• The care and cure of those with a malady, and the care of those who cannot be cured</td>
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<td>• The avoidance of premature death and the pursuit of a peaceful death</td>
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QUALITY AND SAFETY IN HEALTHCARE

The issues of quality and safety in health care have received widespread attention, especially in the last two decades when numerous publications in the scientific and the lay media have focused on these topics. A lot of research had been done on practice variation, health care quality and patient safety from the 1950’s to the 1990’s. An important group working on health care quality is the Institute of Medicine’s Roundtable on Health Care Quality, which made an important report in 1998, which said:

“Serious and widespread problems exist throughout American medicine. The problems occur in small and large communities alike, in all parts of the country, and with equal frequency in managed care and fee for service systems of care. Very large numbers of Americans are harmed as a result. Quality of care is the problem, not managed care. Current efforts to improve will not succeed unless we undertake a major systemic effort to overhaul how we deliver health care services, educate and train clinicians, and assess and improve quality.”

The Roundtable classified the pervasive quality problems in to three types:

- OVERUSE of procedures and interventions that cannot, on scientific grounds, help the patients who get them – such as 20 percent to 50 percent of more unnecessary surgery rates for specific procedures, and 30 percent or more overuse of powerful antibiotics
- UNDERUSE of treatments and interventions that are known scientifically to be helpful to patients – such as omitting effective vaccines for half of the elderly people in the United States, or failing to use life-extending treatments in half of our heart attack victims
- MISUSE, which refers to errors in execution of care – mistakes and slip-ups that don’t quite fit into the overuse and underuse categories, such as serious medication errors in seven out of one hundred hospital patients

Interest in quality and patient safety in health care have also been seen in the lay media, and Michael Millensen, a three times Pulitzer Prize nominated journalist from the Chicago Tribune have taken an enlightened and provocative look at the state of quality improvement in medicine and the health care system in the USA. He raised numerous issues regarding quality improvement in medicine and the health care system in the USA. An important group working on health care quality is the Institute of Medicine’s Roundtable on Health Care Quality, which made an important report in 1998, which said:

PRACTICE VARIATION IN MEDICINE

Millensen cited the work of Wennberg at the University Hospital in Burlington, USA and at the University of Vermont, School of Medicine. Wennberg’s research on practice variation was received rather unhappily by the Medical School that they requested the federal government to audit Wennberg’s work for violation of rules. The auditors however praised Wennberg’s work instead, but the Medical School authorities still advised Wennberg to find work elsewhere. One of the federal auditors helped Wennberg to obtain a job at Harvard, where with John Bunker, a professor of Anesthesiology and pioneer health services researcher, Wennberg co-edited an editorial in the 6 December 1973 issue of the New England Journal of Medicine on practice variation. This accompanied an article in the journal documenting different rates of surgery in Canada and the USA. In the editorial “the two doctors virtually accused fellow American physicians of killing patients with unnecessary procedures”.

Wennberg’s subsequent work looking at the scientific basis of medical practice got the attention of policy-makers and the public, and even the popular press. His work helped to create an intellectual climate for more other work to be done on practice variation and on the emphasis and the importance of health outcomes research. In fact a lot of work on health services research had been done in the 1950’s and 1960’s, however Wennberg’s work in the 1970’s and 1980’s,brought it to the attention of policy-makers and the public in the USA.

Wennberg’s early experience when his research was not well received by his Medical School has a familiar ring. This had occurred to so many prominent doctors, if we are to look at the history of medicine. Ignaz Phillipe Semmelweis (1818–1865) working at the Obstetric Clinic at the University of Vienna, demonstrated the importance of hand-washing in reducing mortality among his obstetric patients. His colleagues were not impressed with his findings, and he was in fact dismissed from his position. He was so concerned that the lives of thousands of mothers would be sacrificed through the ignorance and conservatism of his colleagues. He preached in favour of hand hygiene, but was not heeded, and was later confined to an asylum where, he ironically died of sepsis. Joseph Lister (1827–1912) worked on the antiseptic principle, where he showed the effectiveness of protecting open fractures from bacteria by using carbolic acid, with very impressive results, which was published in 1867. Despite the impressive results, his methods were very slow to be accepted. His methods were eventually taken up and developed by the Germans in the 1870’s and later followed by the USA, France and eventually England. This pattern of conservatism and reticence to change is often seen in the history of medicine, and not consistent with our modern emphasis on evidence-based medicine. However it needs to be understood and taken
account of, in the management of change process, if change is to successfully occur in implementing new ideas or discoveries.

HOW HEALTH CARE ORGANISATIONS DEAL WITH MAJOR FAILURES

Walshe and Shortell\(^\text{10}\) studied major failures, which was defined as breakdowns in health care services or provision that do substantial harm to many patients, from six countries (The United States, the United Kingdom, Australia, New Zealand, Canada, and the Netherlands). They studied how health care systems and organisations deal with these failures.

Some common themes run through many of the instances of major failures identified and across the countries studied by Walshe and Shortell:

- **Longstanding problems** – these failures have often been present and known about for years or even decades before they are brought to light. Examples include the case of Harold Shipman in England who murdered more than 200 patients during twenty-three years in general practice, and the case of surgeon Robert Brewer who continued in practice in Virginia for more than a decade, despite gross errors and startling instances of incompetence that were known about by the hospital where he worked.

- **Well known problems, but not handled** – key people and stakeholders knew something was seriously wrong and did nothing about it. In the Bristol Royal Infirmary case, poor clinical practices and outcomes in pediatric cardiac surgery were well known within the hospital, and among professional leaders in the Royal College of Surgeons and civil servants at the Department of Health. Similar behavior was observed in a similar failure in pediatric cardiac surgery in Winnipeg, Manitoba, in 1994. In the case of Redding Medical Centre in California, physicians did large volumes of inappropriate and unnecessary procedures on largely healthy patients, and many hospital staff were aware of what was going on. It appeared often the only people who did not know about the problems were the unsuspecting patients and their families.

- **Cause of Immense Harm** – these failures cause immense harm, for example failures in the blood service in Canada caused injury to 30,000 patients.

- **Lack of Management systems** – failures often happened in dysfunctional organizations, where fundamental management systems for quality review, incident reporting, and performance management are lacking, or if present are easily bypassed. There is frequently little collaboration between managers and clinicians and a lack of coherent clinical leadership.

- **Repeated Incidents** – some failures occur repeatedly, suggesting that lessons are not being learned. Health care organizations have been complacent in the face of outright evidence that patients were being harmed, slow to suspect wrongdoing, and reluctant to address the problem.

BARRIERS TO DISCLOSURE AND INVESTIGATION

Major failures appear difficult to expose and investigate and it is striking they are not exposed by systems for quality assurance or improvement, clinical audit, risk management, and external arrangements for regulation, accreditation, and oversight. Walshe and Shortell observed numerous barriers to disclosure and also barriers to reform. They believed that major failures in health care are a product of the distinctive culture of the organizations, the health care professions, and the health system, and is an issue of great international concern with the endemic secrecy, deference to authority, defensiveness, and protectionism.

PATIENT SAFETY

A lot of research had been done on practice variation, health care quality and patient safety since the 1950’s, however the focus on patient safety had the biggest impact on doctors, policy makers and the public after the publication of a report on “The Quality of Health Care in America project” published by the Institute of Medicine, USA in 1999, which addressed the serious issue of patient safety in the delivery of health care.\(^\text{11}\) This report was based on the study of research previously done on practice variation, health care quality and patient safety. It pointed out that at least 44,000 Americans died each year as a result of medical errors, making it the 8th leading cause of death, exceeding those dying from motor vehicle accidents, breast cancer or AIDS. Medication errors alone are estimated to account for 7000 deaths annually.\(^\text{12}\)

The IOM’s first report in 1999 “To Err is Human: Building a Safer Health System” recommended a comprehensive approach to improving patient safety, as there is no single solution to solve the problem. The recommendations were set out a four tiered approach:\(^\text{13}\)

- Establishing a national focus to create leadership, research, tools and protocols to enhance the knowledge base about safety,
- Identifying and learning from errors through immediate and strong mandatory reporting efforts, as well as encouragement of voluntary efforts, both with the aim of making the system continue to be made safer for patients,
- Raising standards and expectations for improvements in safety through oversight organizations, group purchasers and professional groups, and
Creating safety systems inside health care organizations through the implementation of safe practices at the delivery level. (ultimate target of the recommendations)

While the IOM report in 1999 focused on Patient Safety with a call to action to make care safer, the IOM report in 2001 covered broader quality issues, with a call to action to improve the American health care delivery system as a whole in all quality dimensions. This report entitled “Crossing the Quality Chasm: A new health system for the 21st Century” observed that, the current health care system cannot do the job of achieving a health care system of quality that Americans need, want and deserve. Trying harder will not work, changing systems of care will. Safety and quality problems in health care are the result of outmoded systems of work. To have safer, higher quality care, we will need to have redesigned systems of care, including the use of information technology to support clinical and administrative processes. The report has proposed a specific agenda for redesigning the 21st Century health care system and proposes six aims for improvements. Health care should be:

- Safe – avoiding injuries to patients from the care that is intended to help them
- Effective – providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit (avoiding underuse and overuse, respectively)
- Patient Centred – providing care that is respectful and responsive to individual patient preferences and values ensuring that patient values guide all clinical decisions
- Timely – reducing waits and sometimes harmful delays for both those who receive and those who give care
- Efficient – avoiding waste, including waste management, supplies, ideas and energy
- Equitable – providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location and socioeconomic status

A health care system that have achieved improvements in the above six dimensions would be far better at meeting patient’s needs. Patients would receive care that would be safer, more reliable, more responsive, more integrated and more available. Patients can receive preventive, acute and chronic services, from which they are likely to benefit. In such a system, clinicians would experience the satisfaction of providing care that would be more reliable, more responsive to patients and more coordinated than is the case today.

WORLD HEALTH ORGANISATION’S (WHO) RESPONSE TO CALL FOR ACTION ON PATIENT SAFETY

In May 2002, the 55th World Health Assembly adopted WHA resolution 55.18, which urged member states to improve patient safety and quality of health care. In May 2004, the 57th World Health Assembly supported the creation of an international alliance to facilitate the development of patient safety policy and practice in all member states, and to be a major force for improvement internationally. The World Alliance for Patient Safety aims to fulfill WHA resolution 55.18

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<td>Support the efforts of Member States to promote a culture of safety within their health-care systems and develop mechanisms to enhance patient safety;</td>
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<td>Put patients at the heart of the international patient safety movement;</td>
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<td>Catalyse political commitment and global action on areas on greatest risk to patient safety through the Global Patient Safety Challenge;</td>
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<tr>
<td>Develop global norms, standards and guidelines for ways of detecting and learning from patient safety problems to reduce risks for future patients;</td>
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<td>Make safety solutions widely available to all Member States in ways which are as easy as possible to implement and relevant to their needs;</td>
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<tr>
<td>Develop and spread knowledge about evidence-based policies and best practices in patient safety;</td>
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<td>Build consensus on common concepts and definitions of patient safety and adverse events;</td>
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<td>Initiate and foster research in areas which will have most impact on safety problems;</td>
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<td>Explore ways in which new technologies such as simulation methods can be harnessed in the interest of safer care;</td>
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<td>Bring together partners to contribute towards knowledge development and social mobilization;</td>
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<td>Target technical work to reflect the patient safety priorities both of developed and developing countries.</td>
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Building A Safety and Quality Culture

through "international leadership and by creating an over-arching strategy, action programmes and a coalition of nations, stakeholders and individuals to transform the safety of health care worldwide". Their Forward Programme is shown in Fig. 2, and their Action Areas 2006-2007 is as shown in Fig. 3.

Malaysia has supported the activities of the World alliance for Patient Safety, and has formed The National Patient Safety Council, which is working on developing and implementing the national patient safety goals for the country, based on recommendations of the World Alliance for Patient Safety. The Kumpulan Perubatan Johor (KPJ) network of hospitals has adopted and is starting to initiate their own KPJ patient safety goals. This is being built on the framework of the quality assurance and improvement, incident reporting and clinical risk management that already exists in the KPJ management system.

**CLINICAL GOVERNANCE IN KPJ HOSPITALS**

Clinical Governance in the KPJ network of hospitals has been implemented over the last seven years, and is based on the concept and principles of Clinical Governance in the National Health Scheme (NHS) in the United Kingdom. Clinical governance has been cited to be defined as "the framework through which NHS organizations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which clinical care will flourish". It comprises the following broad areas of processes:

- Clear lines of responsibility and accountability for the overall quality of clinical care
- A programme of quality improvement activities
- Clear policies aimed at managing risk
- Procedures for all professional groups to identify and remedy poor performance

**Fig. 3. Action Areas 2006-2007. World Alliance For Patient Safety, World Health Organisation, 2006**

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<th>Action area</th>
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<tr>
<td>Action area 1</td>
<td>The <strong>Global Patient Safety Challenge</strong> will galvanize global commitment and action on a patient safety topic which addresses a significant area of risk for all Member States. In 2005-2006, the Global Patient Safety Challenge is focusing on health care-associated infection with the theme <strong>Clean Care is Safer Care</strong>. For 2007-2008, the Global Patient Safety Challenge will focus on the topic of safer surgery with the theme <strong>Safe Surgery Saves Lives</strong>.</td>
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<td>Action area 2</td>
<td><strong>Patients for Patient Safety</strong> will ensure that the voice of patients is at the core of the patient safety movement worldwide.</td>
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<td>Action area 3</td>
<td><strong>Reporting and Learning</strong> will promote valid reporting, analytical and investigative tools and approaches that identify sources and causes of risks in a way that promotes learning and preventive action.</td>
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<td>Action area 4</td>
<td><strong>Taxonomy for Patient Safety</strong> will develop an internationally acceptable system for classifying patient safety information to promote more effective international learning.</td>
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<td>Action area 5</td>
<td><strong>Research for Patient Safety</strong> will facilitate an international research agenda which supports safer health care in all WHO Member States.</td>
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<td>Action area 6</td>
<td><strong>Safety Solutions</strong> will translate knowledge into practical solutions and disseminate these solutions internationally.</td>
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<td>Action area 7</td>
<td><strong>Safety in Action</strong> will spread best practices for implementation of changes in organizational, team and clinical practices to improve patient safety.</td>
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<td>Action area 8</td>
<td><strong>Technology for Patient Safety</strong> will focus on the opportunities to harness new technologies to improve patient safety.</td>
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<td>Action area 9</td>
<td><strong>Care of acutely ill patients</strong> will identify key patient safety priorities for action in the care of seriously ill patients.</td>
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<td>Action area 10</td>
<td><strong>Patient safety knowledge at your fingertips</strong> will work with Member States and partners to gather and share knowledge on patient safety developments globally in the form of a global report.</td>
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The components of clinical governance include statutory duties, structure and accountability, processes and support as is shown in Fig. 4. Clinical governance is part of Corporate Governance in KPJ and clinical governance reports are regularly tabled at KPJ Board of Directors meetings. A systems approach to improving patient safety and quality in health care is essential, and should be part of the management system of any health care organization, and be included in the structure of clinical governance, and be under the direct oversight of top management and the board of directors. An example of the reporting infrastructure for clinical governance in hospitals is shown in Fig. 5.

The clinical governance committee is led by the medical director of the hospital, with representation from management and other clinical professionals. The medical director is a member of the board of directors of the hospital. This approach in the model of clinical governance, encourages teamwork and collaborative standard setting, helps develop shared information to monitor standards of care delivered. It also empowers and enables clinicians to take the lead to ensure accountability for clinical services delivered.
CONCLUSION

The concern about patient safety and improving quality of health care has been rising around the world. Walshe and Shortell in their study of this in five countries had observed some common themes across the countries studied, including barriers to disclosure and investigation, and barriers to reform. They noted that "despite much rhetoric about primacy of patient's interests, it seems that when it matters most, these interests are too often subordinated to the needs and interests of health care organizations and professionals." These common themes observed by Walshe and Shortell most likely apply to other countries, including Malaysia, and is indicative of the enormity of the task faced in improving patient safety and healthcare quality in our health system.

There is a great need to develop quality improvement in health care as a system property. Similarly patient safety needs to be developed as a system quality and using knowledge and experience in safety science to be applied to health care services. The IOM report (2001), had proposed an ambitious, important and much needed agenda for redesigning the 21st – century health care system. It is very complex, and includes a new vision, new objectives, new rules to redesign health care delivery, the practice of evidence based medicine, aligning payment policies with quality improvement and continuing professional development that is relevant to clinical practice and performance.

There is a need to create a more open, transparent, equitable and accountable health care culture. In so doing, there should be greater emphasis on the goals of medicine as reiterated by the Hastings Center consultation, and the importance of patient safety and quality improvement in health care should be incorporated into the curriculum in medical and health professions education, at undergraduate and graduate levels. There need to be greater progress in the measurement of clinical performance, reporting of health care quality and patient outcome information. There must be greater demand for accountability from health care organizations. There must also be more coherent, principled and capable clinical and managerial leadership of health care organizations. The challenge is immense, and clinicians have the opportunity to take the leadership role and participate in this process of change, which is occurring around the world. They can do this particularly by championing the importance of quality improvement and patient safety in their respective practices and in healthcare delivery in their hospitals, and by ensuring the development of clinical governance as part of corporate governance in their hospitals.

REFERENCES

INTRODUCTION

Healthcare associated infections (HAIs) are infections acquired as a result of contact with the healthcare system in its widest sense - from care provided in the home, to primary care, nursing home care and acute care in hospitals. Transmission of healthcare associated pathogens most often occurs via the contaminated hands of healthcare workers.1

Hand hygiene is one of the most important procedures for preventing the spread of disease. We all know that, but in practice compliance with hand hygiene remains capricious even in premier healthcare centers. Boyce and Pittet indicate that "Hand hygiene has long been considered one of the most important infection control measures for preventing healthcare associated infections. Failure to perform appropriate hand hygiene is considered to be a leading cause of healthcare associated infections and the spread of multi-resistant microorganisms and has been recognized as a significant factor to outbreaks."2

Nurses and other healthcare workers are frequently reminded of the importance of hand hygiene in preventing infections. In studies conducted between 1980 and 2001, the Center for Disease Control and Prevention (CDC) found that "among all healthcare workers, compliance with recommended hand-hygiene procedures was poor, occurring an average of 40%".3

Concern related to the practices and compliance level to hand hygiene does not rely on individual factors alone, because of the complexity of the process of change, it is not surprising that this solo intervention often fails. Therefore multi-disciplinary strategies are necessary. Success requires active participation from organizations, social support, networks and each individual healthcare worker. It is also recognized that these improvements could not easily be achieved and that the system needed to be changed.4

The 2008 International Patient Safety Goals developed by the World Alliance for Patient Safety are designed to ensure that the organization’s goals are being met and provide succinct, prioritized information to help promote healthcare safety across the organization.5 In line with the Government’s goal to promote a culture of safety and quality, KPJ Healthcare Berhad agreed to adopt and implement these seven safety goals.

This paper describes the initial development, implementation and sharing of experience in developing the Hand Hygiene policy at KPJ Damansara. A guideline has been developed as a quality improvement initiative, to help promote hand hygiene awareness by implementing hospital wide programme with specific quality improvements that immediately benefit patients and healthcare workers.
LITERATURE REVIEW

Hands are the principle route by which cross infection occurs. Hand hygiene is the single most effective infection-control behaviour that stops the spread of infection. There are a number of factors that appear to affect healthcare workers' compliance with hand-hygiene guidelines. Studies have shown that each individual's perception, motivation and compliance show variations between professions. Nurses have a higher compliance rate than doctors. A study by Pittet et al noted that non-compliance was higher before high-risk procedures, while Jenner et al observed that full compliance with hand hygiene when care activity posed a high risk of cross-infection was poor.

The exact nature of the compliance with hand-hygiene guidelines requires an understanding of what motivates such behaviour. For example, healthcare workers are generally aware of recommendations regarding hand hygiene but knowledge and education do not in themselves continuously motivate hand-hygiene behaviour. This is supported by Jenner et al who showed that rates of compliance with hand hygiene differ.

AIM

This study's aim is to examine healthcare workers' compliance with hand hygiene and to develop a policy to be adopted by all KPJ Hospitals with the objective to improve practices through education and provision of adequate hand hygiene facilities for employees, patients and guests.

SAMPLE SETTING

The sample for this study was obtained from all nursing units. Five clinical areas were selected for our pilot project, namely Intensive Care Unit, Neonatal Intensive Care Unit, Special Care Nursery, the Adult Medical Ward and a Consultant Clinic.

PROCEDURE

We collected information from the infection control department regarding changes in hand hygiene policies and procedures before and after publication of the Hand Hygiene Policy Guideline (HHPG); obtained documentation regarding staff education, infection control policies and procedures, product usage and multi-disciplinary meetings regarding hand hygiene and collected data regarding rates of HAI within the nursing units studied.

During our survey, we audited units from which infection rates were available, observed directly staff hand hygiene practices in the units and administered an anonymous survey to staff (ie, physicians, nurses, and any ancillary direct patient care staff such as respiratory therapists) regarding their awareness of the HHPG.

INSTRUMENTS AND MEASURES

Hand Hygiene Questionnaire implementation and compliance measures

The Hand Hygiene Questionnaire Survey was used to interview the nursing staff. It measured hand hygiene awareness and consisted of three parts: (1) the awareness of hand hygiene within the hospital (eg, the extent to which it had been discussed with staff, and whether or not there were special sessions conducted to educate staff about hand hygiene); (2) the presence of the recommended products in the clinical units (availability of hand hygiene products) and (3) staff attitudes and practices of hand hygiene (hand washing or hand rub) (Appendix A).

We also collected data regarding factors that could potentially confound the relationship between hand hygiene and infection rates, and policies or other infection control practices, and occurrence of outbreaks.

The Hand Hygiene Surveillance Form was used for direct observation of hand hygiene behavior in the nursing units to assess the specific circumstances in which health care workers do or do not comply with the guidelines. On the tool, indications for hand hygiene from the CDC Guideline were listed. While directly observing a patient care provider, the observer noted when one of the indications occurred and then whether hand hygiene also occurred, either with soap and water or with an alcohol-based product. From these observations, it was possible to calculate an overall hand hygiene rate (number of hand hygiene episodes/number of indications) as well as a proportion of hand hygiene.

RESULTS

We found that common barriers to staff members' compliance with hand hygiene guidelines were lack of knowledge among personnel on the importance of hand hygiene in reducing the spread of infection, lack of understanding of correct hand hygiene technique, poor compliance to policies and procedures, increased workload and activities, overcrowding, insufficient and poor access to hand hygiene facilities and posters and lack of training. Our findings were similar to those reported by healthcare workers in the US.

Hand Hygiene Guideline implementation and hand hygiene compliance

Information about hand hygiene was widely disseminated. In all nursing units surveyed, the
awareness of hand hygiene had been discussed at staff meetings and infection control meetings (as confirmed by meeting minutes), included in staff educational programs (as confirmed by continuing education records), and 82% of 155 staff members who were anonymously surveyed confirmed that they were familiar with the HHPG.

Appropriate supplies and products were readily available on all patient care units observed, and staff were aware of the written policy prohibiting artificial nails.

Nevertheless, the majority of nursing units did not monitor hand hygiene compliance routinely. The findings revealed that hand hygiene compliance rates ranged from 24% to 89% (mean, 56.6%) per unit.

After analyzing the Hand Hygiene surveillance audit finding, a training program was scheduled for all categories of staff (nursing, allied health, and support services staff). We aimed for 80% of KPI DSH to be trained. At the same time, we conducted monitoring on Hand Hygiene facilities and hand hygiene practices to all healthcare workers including consultants according to the surveillance schedule.

With the findings above our team has developed a policy on hand hygiene and strategies to sustain and ensure full compliance by each healthcare personnel:

1. The policy states that all healthcare providers must comply to the hand hygiene policy.
2. The hospital must be well-equipped with hand hygiene facilities as follows: Installation of Hand Hygiene facilities (hand washing areas and hand rub facilities) at all clinical and non-clinical service areas. The team surveyed the availability and locations of hand washing facilities and areas with alcohol-based hand rub dispensers and arranged for installation of additional dispensers in locations that lacked them. The alcohol-based hand rub dispensers will be placed at all the points of engagement (patient contact areas) (Fig. 1). ‘Points of engagement’ refers to areas that are easily accessible to staff by being as close as possible to where patient contact is taking place to make hand hygiene more convenient.
3. To reinforce good hygiene practices our local committee conducted awareness campaign and training based on a structured training plan covering indication and purpose of hand hygiene and a demonstration on proper hand hygiene technique. Hand hygiene posters are displayed at all clinical and non-clinical service areas. They are placed near to hand washing basins, corridors and made easily visible to staff, patients and visitors.

   With baseline data gathered, the team launched a comprehensive education and promotional campaign that included group presentations as well as written information for hospital staff and patients about the importance and the proper techniques of hand washing. As a key element of the program, the team also encouraged the managers of all units to serve as hand washing champions, observing staff and reinforcing the message about the importance of hand hygiene.
4. It is our aim to train everyone working in the healthcare system on infection control practices, of which hand hygiene is one of the most important practices. The HHPG has been incorporated and is a mandatory agenda in the orientation program for new employees.

Fig. 1. Points of Engagement of Hand Hygiene (In Patient)

<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive patient</td>
<td>UM, SRN, C/A &amp; CLERK</td>
</tr>
<tr>
<td>Orientate Patient / relative</td>
<td>UM, SRN, C/A &amp; CLERK</td>
</tr>
<tr>
<td>Patient assessment</td>
<td>UM &amp; SRN</td>
</tr>
<tr>
<td>Consultant review</td>
<td>CONSULTANT, UM &amp; SRN</td>
</tr>
<tr>
<td>Nursing Management</td>
<td>UM, SRN</td>
</tr>
<tr>
<td>Procedure</td>
<td>CONSULTANT, UM, SRN, C/A &amp; CLERK</td>
</tr>
<tr>
<td>Discharge</td>
<td>Key: Your moments for Hand Hygiene</td>
</tr>
</tbody>
</table>

Key: ✭ Your moments for Hand Hygiene
5. To ensure compliance, audits will be conducted twice in a year by certified assessors and surveillance audits will be conducted three monthly to evaluate the compliance of the hand hygiene practices. In order to confirm that all aspect of hand hygiene protocol is being followed, the team has revised the hand hygiene surveillance form, tailoring it to the specific areas and issues being audited. The checklist is user-friendly - a simple yes/no checkbox for each audit criteria (Appendix A).

DISCUSSION

The Hand Hygiene Guideline was widely disseminated to all nursing units, the majority of staff members were familiar with it, and hand hygiene facilities were readily available. Multiple barriers to adherence to clinical practice guidelines or implementation of research findings have been described. In our study, lack of awareness and external barriers were unlikely to be important because most staff members knew about the HHPG and its recommendations and adequate copies were made available.

Improving and maintaining effective hand hygiene habits requires a combination of assessment, education, and ongoing monitoring. Encouraging good hand hygiene practices among healthcare workers is a good start but more should be done to educate the public about keeping their hands clean when they are in a healthcare centre. Focusing on improving hand hygiene was part of a larger hospital-wide infection control effort. But in order to get there, everyone who works with or around patients must take personal responsibility for good hand hygiene.

CONCLUSION

It is clear that effective implementation of guidelines requires a comprehensive approach involving various levels within the organization. Infection control departments are unlikely to be able to implement successfully such multidisciplinary efforts without the support of the management.

REFERENCES

### I: SURVEILLANCE AUDIT ON PROPER TECHNIQUE OF HAND WASHING METHOD

<table>
<thead>
<tr>
<th></th>
<th>HAND WASHING</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
<th>COMMENT</th>
<th>F/UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wet hands with water.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Apply enough soap to cover all surfaces.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rub hands palm to palm.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Right palm over left dorsum with interlaced fingers and vice versa.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Palm to palm with fingers interlaced.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Backs of fingers to opposing palms with fingers interlocked.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rotational rubbing of left thumb clasped in right palm and vice versa.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Rotational rubbing of right wrist clasped in left palm and vice versa.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### II: SURVEILLANCE AUDIT ON PROPER TECHNIQUE OF HAND RUB METHOD

<table>
<thead>
<tr>
<th></th>
<th>HAND WASHING</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
<th>COMMENT</th>
<th>F/UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dip all fingers of right hand into left palm filled with hand rub solution, pour hand rub solution over to right palm and dip all fingers of left hand into hand rub solution.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Rub hands palm to palm.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Palm to palm with fingers interlaced.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Right palm over left dorsum with interlaced fingers and vice versa.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Palm to palm with fingers interlaced.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Backs of fingers to opposing palms with fingers interlocked.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rotational rubbing of left thumb clasped in right palm and vice versa.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### III: HAND HYGIENE ASSESSMENT FORM

<table>
<thead>
<tr>
<th>FACILITIES</th>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
<th>F/UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand hygiene facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Wash basin with anti splash devices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Elbow type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand hygiene supplies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Liquid soap solution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Liquid soap dispenser</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Paper Hand towel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand rub is visible and easily assessable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posters on hand hygiene clearly displayed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Washroom, sink, and notice board</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A foot operated waste bin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attendance on Hand Hygiene training</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are any members of staff observed to be wearing hand jewellery?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do any members of staff observed have long nails, nail vanish?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When asked were staff able to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locate Hand Hygiene policy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate an acceptable Hand Hygiene technique</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reducing Risk of Patient Harm Resulting From Falls

Maygala A.,1 Primuhasa Putra SHA,1 Aziz AR,1 Suzana K,1 Ainol MR,1 Zainab MN,1 Jaliah MJ,2 Halimaton DY,2 and Sumaria AM2

ABSTRACT
This article collates the strong evidence based approaches in developing solutions to reduce the risk of harm resulting from patient falls throughout the hospital. A structured assessment tool to identify patients who are at high fall risk and appropriate fall prevention interventions has been developed. KPJ Medical Journal 2010; 4:14–19

Key words : Patient falls, risk, assessment tools.

INTRODUCTION
Way back more than 145 years ago, Florence Nightingale noted in her preface that the very first requirement in a hospital is that it should do the sick no harm.1 In 2005 it was noted the morbidity and mortality among hospitalized patients throughout the United States has heightened concerns about professional competency.2 Error can occur in any system involving human beings and today as we look at patient safety in a multidimensional approach, this leaves the healthcare providers under increased scrutiny to provide effective care that is safe.

KPJ being the nation’s largest healthcare conglomerate strives to cultivate safety and quality in its daily work culture. During the KPJ Medical Workshop in 2008, KPJ Seremban Specialist Hospital and KPJ Selangor Specialist Hospital were given the responsibility to work on the International Patient Safety Goal: Reducing the Risk of Patient Harm Resulting from Falls3,4 that was adopted from the list of International Patient Safety Goal proposed by Joint Commission International in 2008. KPJ Seremban Specialist Hospital accumulated the higher-than-average number of patient falls in year 2008 within the KPJ group of hospitals and it was indeed a challenge to take up this patient safety goal.

Patient falls are a challenging safety and quality related issue in acute care settings where an aging population and persons with physical and cognitive limitations are exposed to an unfamiliar and potentially hazardous environment.5 In this transformational century, in a world of high-tech treatment and fast-moving medical advancements, it is ironic that something as simple as a patient falling is such a problem. There is a need to emphasize the importance of patient falls as these are frequently cited complaints and have been the subject of over 600 negligence claims via the NHS Litigation Authority in the past 10 years.6 This is associated with patients’ family often perceiving falls as a failure in the duty of care by of the hospital staff but this can be unfair, as many falls cannot be prevented and are a feature of the underlying medical problem or frailty of the patient himself.

OBJECTIVE
This article describes hospital wide strategies for prevention of falls and the prevention precautions were developed based on the contributing factors from root cause analysis of retrospective data collected on the incidents of falls and near misses in the hospital. Although the fall prevention programme is still in its infancy, the initial results are encouraging.

METHODS
Definitions
Fall is defined as the loss of upright position that results in landing on the floor, ground or an object such as furniture or a sudden, uncontrolled, unintentional, non purposeful, downward displacement of the body to the

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floor or hitting another object like a chair or a stair. Patients who are assisted to the floor by staff and would have fallen without the staff assistance will also be identified as fall. Falls are not due to any intentional movement or extrinsic force and hospital patients are at greater risk of falling compared to other people in the community.

A near fall (near miss) is a sudden loss of balance that does not result in a fall or other injury. This includes a person who slips, stumbles or trips but is able to regain control prior to falling. An un-witnessed fall occurs when a patient is found on the floor and neither the patient nor anyone else knows how he or she got there.

Some classify falls based on environment, as well as physiological factors and another approach suggests that falls be classified as accidental, unanticipated physiological or anticipated physiological. Accidental falls occur when patients fall unintentionally, for example trip or slip because of environmental factors such as slippery or wet floor. Unanticipated physiologic falls occur due to physical conditions that cannot be predicted until the patient falls such as a fainting spell or a seizure. Anticipated physiological falls occur in patients when they have been assessed and rated as risk of falling due to some characteristics identified in the individual such as impaired gait or on sedation.

Analysis

A retrospective analysis of all patient falls that were registered amongst the inpatients and outpatients in the Seremban hospital was taken into this study.

A data collection spreadsheet was used to analyze and better understand patient falls in this 130 bedded hospital from January to September 2008. Information was collected on related factors of the falls as they occur, to further track and communication patterns, issues, and potential interventions required.

RESULTS

An analysis of what the patients were attempting to do at the time of a fall and the demographical data of the falls is shown in Table 1.

The root cause factors contributing to falls were identified and the findings are tabulated as in Fig. 1.

### Table 1 — Time and location factors related to falls

<table>
<thead>
<tr>
<th>Description</th>
<th>Patient Type</th>
<th>Time</th>
<th>Site/Activity</th>
<th>Companion Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>Paeds</td>
<td>AM</td>
<td>Bed</td>
<td>Yes</td>
</tr>
<tr>
<td>21</td>
<td>3</td>
<td>9</td>
<td>Sleeping</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>3</td>
<td>Toilet</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>7</td>
<td>Mobilizing</td>
<td>No</td>
</tr>
<tr>
<td>Total Falls</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Fig. 1. Contributing factors to falls

<table>
<thead>
<tr>
<th>Level</th>
<th>Related to the Person’s Condition (Intrinsic)</th>
<th>Related to the Environment (Extrinsic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipated</td>
<td>• Recent history of falls (most significant risk factor)</td>
<td>• Environment (wet floor, floor glaze, cluttered room, poor lighting, inadequate handrail support, loose cords or wires)</td>
</tr>
<tr>
<td></td>
<td>• Incontinence, etc.</td>
<td>• Inappropriate footwear</td>
</tr>
<tr>
<td></td>
<td>• Mobility/balance/strength problems</td>
<td>• Wheels on beds</td>
</tr>
<tr>
<td></td>
<td>• Dizziness/vertigo</td>
<td>• Prolonged length of stay</td>
</tr>
<tr>
<td></td>
<td>• Age (6 months to 60 years)</td>
<td>• Placing child on adult bed</td>
</tr>
<tr>
<td></td>
<td>• Overall poor health status</td>
<td>• Beds left in high positions</td>
</tr>
<tr>
<td>Unanticipated</td>
<td>• Seizures</td>
<td>• Individual reactions to medications</td>
</tr>
<tr>
<td></td>
<td>• Cardiac arrhythmias</td>
<td>• Without companion</td>
</tr>
<tr>
<td></td>
<td>• CVA or TIA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Syncope</td>
<td></td>
</tr>
</tbody>
</table>
The contributing risk factors in the ‘unanticipated’ group is considered as ‘general risk factors contributing to falls’ as they can happen to any patient, while the ‘anticipated’ group was categorized as ‘specific risk factors’ as it identifies those patients who are at risk of falling. The interventions were formulated based on these general and specific contributory risk factors to falls. The interventions for the general risk to fall were identified as ‘standard’ or ‘universal fall prevention precautions’ for all patients. The interventions for specific risk factors were identified as ‘strict precautions’ targeted specifically for those who are at high risk of falling (Fig. 2).

It was noted in National Patient Safety Goals (NPSG) of 2008, 4 the specific requirement firstly is to “assess and periodically reassess each patient’s risk for falling, including the potential risk associated with the patient’s medication regimen, and secondly to take action to address any identified risks.” Assessment and reassessment for risk of falling are performed for the following patients:

• On admission and transfer in.
• All confused patients, regardless of age.
• All elderly patients (more than 65 years old)
• All post operative cases.
• All post delivery patients.
• All post invasive procedures such as scopes and angiogram.
• When there are changes in the medical condition of the patient (e.g. changes in glucose level/changes in vital signs).
• Following a fall (on regular intervals) as a post fall management intervention.

---

**Fig. 2. Inpatient strategies to reduce the risk of patient harm resulting from falls**

<table>
<thead>
<tr>
<th>Standard Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unanticipated risk factors</strong></td>
</tr>
<tr>
<td><strong>Nursing Staff</strong></td>
</tr>
<tr>
<td>To nurse on a low bed with side rails and monitor patient’s coordination and balance.</td>
</tr>
<tr>
<td><strong>Education</strong></td>
</tr>
<tr>
<td>Orientate patient and family to room environment, toilet facilities, brief on side effects of medication where applicable and advise on suitable footwear.</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
</tr>
<tr>
<td>Lock all moveable equipments and place personal care items within reach.</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
</tr>
<tr>
<td>Provide physically safe environment with adequate lighting.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strict Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anticipated risk factors</strong></td>
</tr>
<tr>
<td><strong>Nursing Staff</strong></td>
</tr>
<tr>
<td>Place patient in room identified for close observation and place indicators such orange ID band as an indicator of risk to fall.</td>
</tr>
<tr>
<td><strong>Medical Staff</strong></td>
</tr>
<tr>
<td>Clinician to review medication and treat the underlying medical conditions.</td>
</tr>
</tbody>
</table>
DISCUSSION

Assessment tools

There are several risk assessment tools available such as the Morse Fall Scale (MFS) and Hendrich Fall Risk Assessment Tool (Fig. 3). MSF was being used throughout the KPJ Group. However, falls were still occurring and based on the contributing factors of retrospective patient fall data, the assessment criteria were reviewed and are now known as KPJ Fall Risk Assessment Tool (KPJ FRAT).

The main advantages of KPJ FRAT are:
1. Focuses on required interventions for the general risk and specific risk factors as it encompasses most of the criteria of the other 2 tools.
2. Rating mechanism is easier and user friendly as compared to the MFS and Hendrich. Both MFS and Hendrich Scale require the checklist to be completed, however a “yes” to any one of the KPJ FRAT criteria considers the patient to be at high risk requiring the standard and strict precautions to be undertaken.
3. There are only two risk categories of patients requiring two types of interventions:
   - standard fall precautions.
   - strict fall precautions.

The main disadvantage of this assessment is that nearly every patient will be put into the category requiring standard fall precautions.

Outpatient fall risk assessment and fall prevention strategies

Besides focusing on reducing falls amongst the hospitalized patients, awareness and skills to provide a safer patient environment for outpatients was undertaken. Outpatient strategies to reduce the risk of patient harm resulting from falls were developed based on the selected ‘fall risk’ criteria as tabulated in Fig. 4.

Fig. 3. Comparison of the risk factors of the fall assessment tools

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Hendrich(^{11})</th>
<th>MFS(^{10})</th>
<th>KPJ FRAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent History of falls</td>
<td>×</td>
<td>×</td>
<td>x</td>
</tr>
<tr>
<td>Secondary diagnosis</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Ambulatory aid</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>IV /Heparin lock</td>
<td>×</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Poor mobility/generalised weakness</td>
<td>×</td>
<td>×</td>
<td>x</td>
</tr>
<tr>
<td>Mental status</td>
<td>×</td>
<td>×</td>
<td>x</td>
</tr>
<tr>
<td>Confusion /disorientation</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Dizziness / vertigo</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Altered elimination</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Multiple medication</td>
<td>×</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Risk assessment score</td>
<td>Rated as High, Moderate or Low</td>
<td>Rated as High, Moderate or Low</td>
<td>Requires ‘Standard’ or both ‘Standard &amp; Strict’ Precaution</td>
</tr>
</tbody>
</table>

Fig. 4. Outpatient precautions to prevent falls based on the ‘fall risk’ criteria

<table>
<thead>
<tr>
<th>Risk Criteria</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mobility: those using the wheelchair, stretcher or walking aides.</td>
<td>i. Attend to patient immediately.</td>
</tr>
<tr>
<td>• Patients with unsteady gait.</td>
<td>ii. Accompany / allow family members to be with the patient at all times throughout the treatment.</td>
</tr>
<tr>
<td>• Children below 12 years of age and</td>
<td>iii. A&amp;E / OPD: Place orange label as indicator of risk to fall.</td>
</tr>
<tr>
<td>• Elderly who is more than 65yrs.</td>
<td>iv. Strap patient to stretcher/ wheelchair when doing procedures.</td>
</tr>
</tbody>
</table>
Team approach

The responsibilities lie on those working within the specified areas to ensure compliance of the following outpatient standard fall precautions;

i. Hallways and patient areas are well lit.
ii. Hallways and patient areas are uncluttered and free from spills.
iii. Tables and chairs are sturdy.
iv. Display of fall prevention policy to the public.
vi. All assistive devices such as wheelchairs, walkers and panel frames along the walls are in good condition and functioning well.

vii. Unsafe situations are dealt with immediately either by dealing with the situation directly or notifying the appropriate staff and ensuring corrective actions are taken immediately.

The strategies to reduce the risk of patient harm resulting from falls are elaborated in Fig. 5.

Post implementation data

After implementing the fall prevention strategies the data on falls and near misses were continuously monitored, however only one data point was analyzed that is the rate of falls. The rate of fall is a measurement of risk that tells you how many falls are expected for every 1000 bed days of care (BDOC). Bed days of care tells you how many days patients were in the beds, locally known as inpatient days.3

For every 1000 bed days of care you can expect to have about 4 falls. Prior to intervention it was found that for every 1000 bed days of care there were about 6.42 falls from January 2008 till September 2008. The fall prevention precautions structured and implemented

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**Fig. 5. Flowchart showing fall risk assessment & risk reduction to falls**

- **Inpatient**
  - Patient Admitted / Transfer In
  - Assessing KPJ Fall Risk Assessment Tool
  - 
    - NO' to all of KPJ FRAT questions
      - Implement Inpatient Standard Fall Precautions
      - Re-assess for changes in Risk level to fall
      - * NO' to all of KPJ FRAT questions
    - YES' to any one of KPJ FRAT questions
      - Implement Inpatient Standard & Strict Fall Precautions
  - Evaluate risk to fall at every shift and PRN

- **Outpatient**
  - High Risk to Fall Criteria
    - Mobility – wheelchair / stretcher
    - Unsteady Gait
    - Using Walking Aides
    - Children below 12 years
    - Elderly who is more than 65 years
  - Outpatient Strict Fall Precaution
    - Attend to Patient immediately
    - Accompany / Allow family members to be with the patient at all times.
    - Remind patient / family to call for assistance when needed.
    - A&E: Place orange label with falling star with patient’s name & MRN on the requisition forms when sending for other investigation / treatment to other services.
    - Strap patient to stretcher / wheelchair when doing procedures.
    - Chaperon / accompany patient upon completion of procedure/treatment until they leave the hospital premises.
  - Discharge / Transfer Out to other Hospital

* - Changes in condition
from October 2008 till December 2008 helped the healthcare providers learn to identify the patients who have the highest risk for sustaining a serious injury from a fall and implement the interventions to prevent or mitigate these injuries. The post implementation data reflects for every 1000 inpatient days the fall rate decreased to 2.18 falls over a period from January 2009 till September 2009 (Table 2).

**What to do in the event of a patient fall**

Although precautions are taken appropriately and if a fall occurs, the incident needs to be attended to immediately and following the post-fall assessment an incident report should be completed. Fall prevention interventions should be reviewed and care plans should be modified appropriately.

**CONCLUSION**

Falls and the associated negative outcomes in patients are of significant concern. The etiology of hospital patient falls is multi-factorial including both intrinsic and extrinsic factors. Many of the health problems that increase the chance of falling are known and are treatable. Although leaders in healthcare may focus on fall rates but it is important not to lose sight of our goal which is to reduce harm resulting from falls and reduce the severity of fall related injury.

Preventive strategies starts with assessing and reassessing periodically the patient’s modifiable fall risk factors in a collaborative team approach towards ensuring the safety of an individual in a healthcare setting. The challenge for healthcare professionals will be to support patient safety and quality of care initiatives by early identification of patients at risk for falling, and implement the interventions to prevent falls and related injuries.

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4. Risk Committee Members of KPJ Seremban Specialist Hospital & KPJ Selangor Specialist Hospital.

**REFERENCES**

A System Approach to the Reduction of Medication Administration Error Among Nurses

Zaharah Osman, SRN, MSc

ABSTRACT
Nurses are responsible for correct administration of medication. Drug administration is an integral part of the nurse’s role. Nurses committing medication administration error is inevitable considering that nurses are the ultimate person to administer the drug to patients, although the error could have been contributed by others. This paper discusses the issues of medication administration error and focuses attention on the nurse as the sole weak point in the chain and on the general perception that nurses are solely accountable although the prescribing process is multidisciplinary in nature. KPJ Medical Journal 2010; 4:20–22

Key words: Medication error, nurses.

BACKGROUND
“A medication error is generally defined as a deviation from the physician’s medication order as per written on the patient’s chart”.1 Drug administration is an integral part of the nurse’s role. Nurses are responsible for correct administration of medication, yet medication errors are a persistent problem associated with the nursing practice.2 The likelihood of a nurse causing error is inevitable because she is in the front line in carrying out the medication order prescribed by doctors.

There are several factors in the ward setting impacting on the nurse’s ability to administer medication correctly.3 A study conducted in US hospitals found that factors related to workplace distraction accounted for 43%, staffing issues such as shift changes and floating staff accounted for 36% and workload increases accounted for 22% of incidents.4,5

Medication error is a worldwide problem. Medication errors occurred in 5.07% of the patients admitted each year to US hospitals.5 Administration errors accounted for 51% of written incident reports. Further, 24% of the reports described transcription/verification errors, 16% described ordering/prescribing errors, 10% described dispensing/delivery errors and 29% described administration of wrong dose.5

SYSTEM FACTORS

Nurses manage a wide range of challenges in a demanding and often hectic workplace; attending to patients, doctors, visitors, telephone calls, billing inquiries, charges, nursing care and assisting in doctor’s procedures, preparation of patient for surgery, sending patients to the operation theatres for radiological procedures and physiotherapy. They also collect, dispense and administer medications, trace laboratory results, manage and collect ward stock, attend and facilitate housekeeping and maintenance. The combination of these factors may lead to bad outcomes like medication error.

Shortage of staff and high turnover of RNs with increasing numbers of beds, expansion of wards without taking into consideration of staff availability, force nursing managers to resort to the use of extended work shifts and overtime. "The risk of making an error was significantly increased when work shifts were longer than twelve hours, when nurses worked overtime, or when they worked more than forty hours per week".7

Within the nursing fraternity preliminary anecdotal reports suggest there are several factors in the environment impacting on the nurse’s ability to administer medication correctly thus putting nurses at risk of making errors; high bed occupancy, patient acuity levels, shortage of nurses, lack of support from other support services, difficult patients who refuse to take medication served to them in time, multi-tasking, multi-disciplinary ward, multi-specialty medical consultants, uncooperative doctors, illegible or poor hand written orders, verbal orders, unclear regime, lack of information, using dangerous abbreviations, prescription error, unsystematic dispensing, inefficient and poor delivery system by pharmacy, insufficient supply of drugs and confusion with complex drugs eg; look alike, sound alike drugs, new drugs, unfamiliar drugs, multiple drugs dosage and improper storage of drugs.
IMPACT ON NURSES

The nursing profession has always regarded patient safety as being of the utmost importance. Florence Nightingale stated that "the very first requirement in a hospital that it should do the sick no harm".8 Nurses are generally willing to accept responsibility for their errors and did what they could to reduce any harm to the patient.9 Most nurses feel upset and emotionally affected. They feel paralyzed and powerless and their self-confidence is shattered. Their loss of control and the feeling of guilt grow to the extent that even years after they still struggle to handle the stress caused by the error.9,10 The psychological trauma can be overwhelming to a nurse to a certain extent that it affects them personally and professionally.10 The way the incident is handled by their superior may make the nurse feel depressed, neglected and betrayed. Nurses feel intimidated with disciplinary actions taken against them including termination and loss of benefits.

The preconceived idea that the nurse is at fault has been perpetuated in the hospital incident submission report and findings where over the years the nurses is blamed for the incident. Generally investigation findings blame the nurse for failing to comply with drug administration policies and procedures and it is always perceived by the nursing manager as an "attitude" problem.

Hospital administrators fail to take into account factors in the environment impacting on the nurse’s ability to administer correctly. The temptation to blame the nurse is common and this is very evident in the root cause analysis findings. As the consequences of the one sided and bias report, nurses are afraid to report errors for fear of disciplinary action that will impact on their image and professional development. A punitive, person-centered approach will not improve the patient safety. Nurses should be allowed to learn from their mistakes thus preventing them from making other similar mistakes in the future.

Mistakes are a sign that a safety problem exists within the hospital setting and not that a nurse is negligent. When conducting an investigation, very little focus was given towards prescribers, pharmacists, dispensers and clerks that can contribute to the occurrence of medication errors. A study revealed that a dispensing error accounted for 0.87% to 2.9%1 of total number of medication related errors. In another study it was found that a total of 2103 errors were detected during the 1-year study period among doctors and pharmacists with an overall rate of errors being 3.99 errors per 1000 medication orders.8

The newly graduated nurses lack the ability to undertake drug calculations and this deficiency has been attributed to poor basic mathematical skills and lack of experience in the use of formulas.12,13,14 This lack of basic mathematical skills is further compounded with lack of understanding of drug indications, contraindications and methods of dilution, route and side effects. Overall, 40% of the nurses who experience medication error have less than one year of work experience.6 It is perceived that many of the nurses are junior and naive; lack of confidence, language barrier, fear of been ridiculed and feeling inferior are common barriers to seeking clarification. It is perceived that the doctors, senior nurses and ward managers who do not like to be disturbed and unapproachable, unfriendly and arrogant are common barriers to effective communication. Nursing managers claim that they always emphasise that nurses should seek clarification when unsure of prescription or illegibly written orders.

STRATEGIES TO IMPROVE MEDICATION ADMINISTRATION SAFETY

“The probability of an accident can never be absolutely zero; however their occurrence can be minimized through a systems approach to the reduction of medication error”.3 We cannot deny that medication errors have serious implications. Strategies should be developed to address the factors underlying an incident that are usually the consequence of breakdowns in the hospital system. A substantial improvement in drug administration safety in the nursing units will not occur until a system approach is adopted.

All professionals ie. doctors, pharmacists, nurse educators and nursing managers should develop a program to ensure that nurses are trained and have adequate theoretical knowledge of pharmacology, basic mathematical skills and accurate application of formulas. Lack of communication between nurses and doctors is the link to medication error.15 We need to create an environment of learning that allows junior nurses to seek and ask question whenever in doubt. We should provide them with adequate resources drug information, sufficient devices e.g. infusion pumps and close supervision through a preceptorship program.

Nursing managers should avoid the use of double shift, 12-hours shift system and overtime shift since long working hours have significant impacts on frequency of errors. They should not allow a nurse to work more than forty two hours per week but allow rest day as per schedule rather than calling them for locum shift when faced with staff shortage.

Multiple roles played by nurses in managing and accommodating all types of patients from adult to pediatric to newborn, patients with multiple conditions, managing multi-disciplinary wards and multi-disciplinary doctors should be seriously reviewed by the hospital administrators. Allowing nurses to focus more on one discipline will improve their expertise in the field. A good nurse-doctor-pharmacist relationships will be developed. Pharmacists can play their role by having regular sessions with nurses to educate them in the use of commonly used drugs particularly newly introduced drugs and "high alert drugs". Doctors should highlight to the nurses drugs indications, side effects and document drug regimes in
detail and specify the method of dilution and route clearly.

CONCLUSION

Drug administration error is a problem in all healthcare settings. A system approach to its improvement is imperative as compared person-centred approach. A system approach will improve safety substantially. Unfortunately nurses continue to take the blame and needlessly accept critique; as a result the system approach has never been addressed. It is imperative that nursing managers should seriously examine the issue of medication administration error and take proactive action in dealing with medication error from the nursing perspective and at the same time a well-reasoned approach by management is important to its improvement.

REFERENCES

The Pathway for Home Mechanical Ventilation (HMV)

Nur Yasmin Jennifer Abdullah, SRN, MSc, and Richard Lobo, MBBS, MD (Anaes)

ABSTRACT
The objective of this project is to help impaired individuals function to their highest possible level, reduce morbidity and mortality, decrease hospitalization through cost effective treatment and experience improved quality of life. An increasing number of individuals use mechanical ventilatory support for all or part of the day; invasive and non invasive. KPJ Medical Journal 2010; 4:23–26

Key words: Home mechanical ventilation.

BRIEF HISTORY

Case 1
A 54 year old Chinese gentleman was involved in a motor vehicle accident in December 1998; sustained a C4/C5 fracture with 50% displacement associated with cord transaction. Had fusion and plating of C4/C5 done and was discharged after 3 months in hospital. Since the year 2000, patient has been able to breathe well without the ventilator and to date still has recurring chest problems and bed sores.

Case 2
A 37 year old Chinese lady who had a history of recurrent thyoma in 2002 as well as myasthenia gravis. She stayed 3 months in the hospital and was discharged after 2 months. She passed away in 2003 due to metastasis. Her family claims that the hospital gave her the best part of her life with the home ventilation program.

Case 3
A 27 year old Chinese man who was involved in a motor vehicle accident on his birthday in 2006, suffered a C3/C4 sublexation with cervical cord contusion. He had dissectionomy and fusion done. Stayed in hospital for 4 months and 3 months after discharge, he was able to breathe well without the aid of the aid of the ventilator.

Case 4
A 58 year old Chinese lady who was involved in a road traffic accident in June 2008 sustaining a burst C5 fracture. She has been nursed in an open ward in a government hospital and has been told that she will be ventilator dependent for the rest her life. The hospital doctors told the family that there was nothing else that they could do for her. She has been identified as our 4th case and we have begun training her care giver. She has been stable with minimal ventilator settings and will be going home in mid October when her room is ready and her maid has arrived to assist the patient’s husband with the provision of care.

This unique program is the brainchild of our consultant anaesthetist Dr Richard Lobo who has previous experience running this program at Hospital University Sains Kubang Kerian, Kelantan. When the program first took off, there were informal guidelines with no proper references developed with the anaesthetist and ICU staff based on knowledge and current practices at that point of time.

As KPJ Johor Specialist Hospital is a premier tertiary privatized healthcare facility, ventilator dependent patients who are fit for discharge and fit the criteria for HMV rehabilitation will definitely experience cost effective care if they were home nursed as opposed to being hospital nursed. On a long term basis, hospital based care will be a financial burden especially for individuals with limited resources. Therefore offering ventilator assisted individuals a chance to live their lives in their own familiar home environment and surrounded by their family would be the ideal solution.

METHODS

Discharge planning team

The discharge planning team facilitates and coordinates the whole HMV program. The team consists of Doctors, Anesthetist, Dietician, Physiotherapist, ICU nurses, the equipment specialist who will supply the required equipment and who will assist the care giver with equipment functions and the direct caregiver of the patient. Once the need for HMV has been established, the discharge planning team is activated. Commitment from both the caregivers and patient must be obtained to ensure the success of HMV (Fig. 1).

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Patient

The patient must fit the criteria for HMV. The type of patient must be one who has no unstable coexisting medical complications, stabilized ventilator settings, metabolically stable, infection free, good renal function and haemodynamically stable. Also the simplest ventilator mode and lowest possible FIO2 must be achieved. Patient needs to be strongly motivated, optimistic, resourceful, determined, flexible and adaptable.

Caregiver

The caregiver is the individual who will provide all the care for the patient at home. The success of HMV depends on the caregiver who must collaborate with members of the discharge planning team. The full realistic picture of the burden imposed on the caregiver must be told; disrupted schedules, financial strain and the provision of round the clock care for the patient. The caregiver should practice providing 24 hour patient care while in the hospital when resources for doing so are available. When they are able to provide the care needed, it builds up their confidence and comfort not only for themselves but for the patient as well. Respite care must be arranged for the caregiver as caring for a ventilator assisted individual (VAI) is hard work and their own quality of life will be changed significantly as the illness or disease of the VAI progresses and their own levels of stress will increase as more is demanded of them.

Training

Teaching has to be individualized to suit the patient and the family and this is the key to the success of HMV. Return demonstrations, techniques and their rationales can be reviewed. Training involves the teaching of basic nursing care and competencies that the caregiver has to acquire; handling of equipment & monitoring of patients health status, care of tracheostomy, suctioning & physiotherapy, routine care of Foley’s Catheter, hand washing and infection control, feeding via nasogastric tube/oral feeding and care of patient on ventilator. The frequency of monitoring will be determined based on the patient’s current medical condition and discharge care plan.

Equipment/home environment optimization

Procurement of equipment is budget driven. Equipment specialists will assist the caregiver and choice of ventilators should be based on patient’s clinical needs. The caregiver must become experienced in changing ventilator circuits, cleaning the mechanical ventilator & troubleshooting when ventilator alarms occur and they should be comfortable using the manual resuscitation bag in case of equipment failure. They must be familiar with the use of the suction machine including battery powered aspirator for use during power failure. Other necessary equipment will include generator, backup battery, primary power source with generator, ripple mattress, oxygen tanks, oxygen concentrator, commode, wheelchair, electrical bed, pulse oximeter, carbon dioxide fire extinguisher, self inflating bag valve mask device with reservoir, resuscitation bag with tracheostomy attachments and mask of appropriate size. TV, DVD and radio player for entertainment, computer to maintain social contacts and electronic BP set for monitoring blood pressure.
Patient’s home environment must be supportive with necessary adaptations identified early. Room on ground floor with minimal stairs to allow easy mobilization on wheelchair and facilitate emergency evacuation and not near the kitchen, air conditioned room, physical structure that is safe and secure, doors wide enough to allow passage of stretcher, bed and wheelchair, windows of adequate size to allow easy escape and optimum viewing, sink for hand washing facilities, storage facilities for disposable supplies, electrical outlets with 3 phase wiring which must be adequate to support the HMV equipment.

**Discharge of patient**

Patient will be discharged when the caregiver is competent, able to provide the necessary care, able to use all equipment that has been procured and are well versed with emergency situations that may arise e.g. fire, natural disaster, power failure, ventilator failure, generator failure, equipment failure, obstruction of airway, accidental de-cannulation and deterioration of medical condition. Patient will be given an instruction booklet which will contain vital information will assist both the patient and caregiver when the patient is discharged e.g. a checklist on daily nursing care schedule, vital sign chart, intake and output chart, tracheostomy suctioning and care, feeding regime and a check list for emergencies that may arise. A system for communicating with the case manager should be established to provide emotional and psychological support after discharge.

**Home visits & follow up**

Home visits will be conducted by the discharge planning team to assess the patient’s condition and skill adaptability of the caregiver after the first 48 hours post discharge and thereafter through intermittent phone calls and visits. It is recommended that the case manager keep in contact with the patient and family a few months post discharge to gather any valuable information that will benefit future patients.

**RESULTS**

There were 3 cases on HMV from the 90s to date in Johor Specialist Hospital and two of them have survived and are living complication free lives without the ventilator. There were two guidelines drawn up in 2007 with proper referencing: one for the nurses of the Intensive Care Unit and one for the caregivers so that there would be a standard practice of procedures for the staff and caregivers to adhere to in order to avoid miscommunication and inappropriate delivery of care.

**DISCUSSION**

HMV for patients with chronic respiratory failure has been known to prolong survival and death will be preventable with regular follow up for secondary complications; pressure ulcers, pneumonia and autonomic dysreflexia. Patients treated with both invasive and non invasive home mechanical ventilation report reasonably good quality of lives. Long term financial burden is unavoidable though it would cost far less than nursing the patient in a hospital. Provision of care by immediate family members and friends may markedly reduce cost but can have other social, psychological and economic consequences. Patient and family experience stress when the home becomes a ‘high tech’ environment with the transference of hospital routine.

**CONCLUSION**

Regular visits and follow up by the discharge planning team will enable the patient to live reasonably well as the patient’s condition and skill adaptability of care giver can be assessed. Importance of good social support, guidance and counseling has beneficial support for patient and their rehabilitation. Being on HMV gives the patient autonomy, personal choice and treatments which were previously not possible in the past. There exists a lack of empirical evidence on the actual managed care process and preparing patients for mechanical ventilation at home is a new arena of nursing and medical staff responsibility. The guideline drawn up for HMV for KPJ Johor Specialist Hospital was based on the current practice of knowledge, its applicability and suitability in a home environment.

**REFERENCES**

A Case of Idiopathic Thrombotic Thrombocytopenic Purpura Successfully Treated with Therapeutic Plasma Exchange

Goh Kim Yen, MBBS, FRCP

ABSTRACT
Thrombotic thrombocytopenic purpura is a rare, serious but treatable clinical condition. It is important to recognise this condition early as prompt therapy results in better outcome. The early clues would be unexplained anaemia with thrombocytopenia in a young adult who presents with unexplained global neurological symptoms. The case illustrates a young male who was successfully treated for this condition. KPJ Medical Journal 2010; 4:27–28

Key words : Thrombotic thrombocytopenic purpura.

CASE REPORT
Mr KM was a 43 year-old man who presented to the Emergency Department, KPJ Damansara Specialist Hospital with chest discomfort, weakness of right side of the body and face, associated with “forgetfulness” which was sudden in onset, started on the day prior to his admission. His other concurrent medical problems were Type II Diabetes Mellitus, Hypertension, Hyperlipidaemia, and he had undergone left knee arthroscopy three months prior to this admission, complicated by *Staphylococcus aureus* septic arthritis which had recovered one month ago.

On physical examination, he was normotensive, blood glucose level was normal. He opened eyes spontaneously, but with conjugate deviation of both eyes to the right. He was unable to neither obey commands nor vocalize. There was pallor with tinge of jaundice. There was a grade 3/5 weakness of the left upper and lower limbs. CT scan and MRI of the brain were reported as normal. Full blood count at presentation showed severe anaemia (Hb7.5g/dL) with thrombocytopenia (29x10^9/L) and normal WBC count. Lactate dehydrogenase was elevated at 1105 u/L. Peripheral blood film demonstrated fragmented red blood cells and thrombocytopenia consistent with microangiopathic haemolytic anaemia (Fig. 1). Coombs’ test was negative.

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He was subjected to a total of sixteen sessions of therapeutic plasma exchange and after the thirteenth run, there was notable improvement in his mental alertness and platelet counts, with resolution of left sided hemiparesis (Fig. 2). He was discharged well after 4 weeks with complete resolution of neurological signs and near normal blood count profile.

DISCUSSION

Thrombotic thrombocytopenic purpura (TTP) is a clinical syndrome characterized by the pentad of fever, microangiopathic haemolytic anaemia, thrombocytopenia, neurological impairment and renal impairment. The pathological changes are due to widespread platelet microthrombi formation. The underlying etiology is due to presence of inhibitor of von Willebrand Factor (vWF)-cleaving protease leading to increased number of large vWF multimers in the blood circulation resulting in excessive platelet adhesion and aggregation. Hence, platelet transfusion is contraindicated. There was no exact association identified in this case although it is commonly described to be associated with pregnancy/post-partum, malignancy, sepsis, bone marrow transplantation, drugs etc. The presentation of this disease is usually abrupt.

The treatment of choice in this disease is therapeutic plasma exchange (TPE) to remove the large vWF multimers from the circulation. Patients usually require multiple sessions of TPE. Improvement can be gauged by improvement in neurological status, thrombocytopenia, and a reduction in lactate dehydrogenase. Other adjuvant and supportive measures are instituted while waiting for recovery in the form of red cell transfusion, haemodialysis, antiplatelet, anticonvulsant etc. The main problems encountered in the management of these patients are the requirement of central venous access in patients who are thrombocytopenic and huge exposure to blood donor products with potential risk of blood-borne pathogen transmission.

The natural course of the disease can be either single episode, relapsing, chronic or refractory. Oral immunosuppressants are occasionally given to prevent a recurrence of disease. The patient was given oral immunosuppressant for a year and has remained well since discharge. It is important for practicing physician to recognize this uncommon yet treatable disease. This disease carries a mortality of over 50% in conservatively managed cases.

REFERENCES


ACKNOWLEDGMENTS

1. Dr Daud Sulaiman, Consultant Cardiologist, KPJ Damansara Specialist Hospital, for giving the opportunity to share the care of patient KM.
2. Ms Zarina Zainal, IT Dept, KPJ Ampang Puteri Specialist Hospital, for her assistance with Fig. 2.
3. All staff from Nursing, Pharmacy, Laboratory & Radiology Departments for their direct and indirect care of this patient.
Peripheral Blood Stem Cell Transplant Procedure for Acute Myeloid Leukaemia in Complete Remission in KPJ Ampang Puteri Specialist Hospital

Goh Kim Yen, MBBS, FRCP

ABSTRACT
Acute myeloid leukaemia (AML) is a malignant white blood cell disorder, which carries a high rate of fatality if untreated. An allogeneic stem cell transplantation is indicated in all types of AML, with the exception of acute promyelocytic leukaemia (FAB M3 subtype), once remission of disease is achieved. The case illustrates a successful stem cell transplantation procedure, utilising stem cells harvested from the peripheral blood, performed at KPJ Ampang Puteri Specialist Hospital. 

Key words: Acute myeloid leukaemia, stem cell transplantation.

CASE REPORT

JK, is a 38 year-old lady who presented in July 2006, post-partum 2 months with right submandibular abscess and fever. She was noted earlier in February that year to have leukocytosis but has declined further investigation in view of her pregnant state. She presented with severe pancytopenia. Haemoglobin level was 5.3g/dL, platelet count of less than 10x10^3/uL and white blood cell count 28.6x10^3/ul. Bone marrow examination confirmed acute myeloid leukaemia, FAB subtypes AML-M6 with normal cytogenetics. She was given induction chemotherapy and followed by 2 more courses of post-remission chemotherapy. She underwent allogeneic peripheral blood stem cell transplant in first complete remission on the 18th of January 2007. She was given myeloablative doses of Busulphan and Cyclophosphamide as conditioning regimen. Methotrexate and Cyclosporin A were used as graft-versus-host disease (GVHD) prophylaxis. The donor was her fully HLA-matched 31 year-old brother. The transplant period was uneventful and she was discharged after four weeks of hospitalization. Reassessment marrow examination performed at day 21 of transplant, on 8th of February 2008 confirmed total engraftment of donor cells (100% 46,XY) by Fluorescent-in-situ-hybridization method on nuclei isolated from bone marrow aspirate.

DISCUSSION

Acute myeloid leukaemia is a type of haematological malignancy with an incidence rate of 1.8 per 100,000 population. It is an aggressive and fatal disease in many. Patients presenting under the age of 60 had an overall 5-year survival of 37%. The favorable prognostic factors are young age at presentation, favorable cytogenetics, low presenting white blood cell counts and absence of previous therapy and Myelodysplastic Syndrome. Hence cytogenetic analysis by karyotyping method is an important test at diagnosis. Studies have demonstrated that stem cell transplantation results in better disease-free survival compared to intensive consolidation chemotherapy alone. It has been a standard practice to subject all patients with AML, with the exception of AML FAB M3, to stem cell transplantation in first complete remission.

The introduction of granulocyte colony-stimulating-factor in the early 1990s has shifted the way stem cells are collected from eligible donors from bone marrow to peripheral blood. This is by means of a cell separator machine. The benefits of using peripheral blood stem cells (PBSC) are many folds mainly avoidance of general anaesthesia and faster engraftment of PBSC compared to marrow stem cells. Faster engraftment will lead to lesser days with neutropenia and thrombocytopenia and further reduction in the morbidity and mortality associated with the procedure.

Unlike solid organ transplantation, stem cell transplantation not only changes the marrow constitution to that of the donor’s, as in this case of sex-mismatched transplantation, the donor’s male cells now reside and proliferate in the marrow spaces of the female recipient.
In addition, there is also similar immune reconstitution to that of the donor’s, hence immunosuppressive agents for the donors are for a limited period only and difference in blood group is not a contraindication to stem cell transplantation.

It requires a team and multidisciplinary approach to make stem cell transplant procedure available in a private hospital setting. Besides the requirement for reverse-isolation room with clean environment and good air quality, the procedure is costly, requires a team of dedicated staff particularly from the nursing and pharmacy department. It also imposes heavy load on the transfusion unit for adequate and prompt blood product support.

REFERENCES


ACKNOWLEDGMENT

1. All staff, from Nursing, Pharmacy, Laboratory & Radiology Departments for their direct and indirect care of this patient.
Unicentric Castleman’s Disease of the Parotid

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ABSTRACT

Castleman’s disease is a rare, benign lymphoproliferative disorder of uncertain origin. It is commonly found in the mediastinum. Extrathoracic site of the disease is uncommon. We report a case of unicentric Castleman’s disease of the right parotid region in 60-year-old male without any associated systemic illness. KPJ Medical Journal 2010; 4:31–32

Key words : Castleman’s disease, parotid gland.

INTRODUCTION

Castleman’s disease (CD) is a benign lymphoproliferative disorder of unknown cause characterized by enlarged hyperplastic lymph nodes. The most common sites of this lesion are the mediastinum, head and neck, cervical lymph nodes, axilla and the abdomen. Though the head and neck is the second most common site, the involvement of the parotid gland is extremely rare.

CASE REPORT

A 60-year-old male presented with a painless swelling of the right parotid region of 6-years duration. The swelling was progressively increasing in size. He had no facial pain, facial asymmetry, weight loss or loss of appetite. On examination, there was an oval shaped, firm, smooth surfaced and non tender swelling of the right infra – auricular region. Blood investigations revealed normal hemoglobin level and markedly raised ESR. CT scan revealed two well defined lesions representing enlarged lymph nodes abutting the inferior aspect of the parotid gland (Fig. 1). Fine needle aspiration cytology revealed reactive lymphadenitis and investigations for tuberculosis were negative. A superficial parotidectomy was done for this patient and histological examination revealed hyaline vascular-type Castleman’s disease of the parotid gland (Fig. 2). Post-operatively patient recovered uneventfully.

DISCUSSION

Castleman’s disease (CD) was first described by Castleman and colleagues in 1956. It is also known as giant lymph node hyperplasia, angiomatous lymph node hamartoma, angiofollicular lymph node hyperplasia, follicular lymphoreticuloma and benign giant lymphoma.

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The pathogenesis of CD has not been elucidated. Some authors favour a theory of lympho-proliferation due to chronic antigenic stimulation by a virus or chronic inflammation while others consider it to be a lymphoid hamartoma.\(^7\)

CD is divided into two clinical subtypes: localized and multicentric. Localized (or unicentric) disease manifests as a solitary mass that may be well circumscribed or infiltrative, with associated lymphadenopathy confined to one lymph node or nodal area.\(^8\)

Two histological subtypes are recognized: classic hyaline vascular type which is usually unicentric, and plasma cell type which can be multifocal (multicentric) and associated with systemic symptoms. The hyaline vascular subtype is more common and contains numerous regressively transformed follicles, with associated vascular proliferation. In the head and neck, 98% of these lesions are of the hyaline vascular type.\(^9\)

Unicentric disease tends to occur in younger patients and is hyaline vascular type in more than 70% of cases, with plasma cell or mixed histology in the remainder.\(^10\)

The plasma cell type contains hyperplastic follicles, with marked plasma cell proliferation in the interfollicular regions. Multicentric disease, commonly of the plasma cell type, usually follows an aggressive and rapidly fatal course.

Castleman's disease often presents a diagnostic challenge because of the paucity of signs and symptoms, lack of diagnostic tools and its tendency to mimic neoplasm.\(^11\) The definitive diagnosis is solely established by histology analysis.

The treatment of localized Castleman's disease is complete surgical excision, with excellent long-term results.\(^10\) This is almost always curative, resulting in rapid resolution of systemic symptoms and laboratory abnormalities. Recurrence are rare in the hyaline vascular type. In patients with multicentric disease or in whom complete resection is not possible, partial resection, radiotherapy, combination chemotherapy and anti-cytokine therapies have all been used, with variable responses.\(^12\)

**CONCLUSION**

Although rare in the head or neck region, Castleman's disease should be considered when investigating masses in these regions.

**REFERENCES**

Cat-scratch Disease Presenting as Parotid Mass

Primuharsa Putra SHA, MD, MSurg ORL-HNS,1 Marina MB, MD, MSurg ORL-HNS,2 Razif MY, MBBS, MSurg ORL-HNS,2 and Tang MK, FRCS, MSurg3

ABSTRACT
Cat-scratch disease of the parotid gland is rare. We report a case of cat-scratch disease of the parotid gland in a 14-year-old boy. Cat-scratch disease was not considered in the initial diagnosis of this patient. Superficial parotidectomy was performed based on initial FNAC which was suggestive of a malignant lymphoid pathology. Post-operatively, histological examination confirmed the diagnosis of cat-scratch disease. KPJ Medical Journal 2010; 4:33–34

Key words: Cat-scratch disease, parotid swelling.

INTRODUCTION
Cat-scratch disease (CSD) is a common, self-limiting disease process. Patients with CSD generally present with regional lymphadenopathy after a cat scratch or bite distal to the involved lymph node. The accurate diagnosis of CSD based on clinical and histopathological findings. CSD can cause a very diverse and fascinating array of clinical syndromes and is capable of affecting organs other than skin and lymph nodes.1 These atypical manifestations, together with serious complications, usually occur more often in the pediatric population and also in immunocompromised hosts.2 Although large series of patients with cat-scratch disease have been detailed in the literature,3,4 involvement of the parotid parenchyma is rare.3,5

CASE REPORT
A 14-year-old Malay boy presented with history of swelling of the right parotid area for 5 days. There was no history of pain, fever or any symptoms during meals. There was no significant past medical of family history. Examination revealed right parotid swelling, measuring 2 x 2 cm, non tender, firm and mobile. There was no sign of inflammation and other swellings were felt in the neck. Throat examination was normal and facial nerve was intact. Total white blood count was 6.9 x 103 /L and erythrocyte sedimentation rate was 44 mm/h. Ultrasound and CT scan of the parotid area showed a well defined 2 x 2.3 cm soft tissue mass within the superficial lobe of the right parotid gland and there was no enlarged cervical nodes. Fine needle aspiration cytology of the parotid swelling reported to be suggestive of a malignant lymphoid pathology. An excision biopsy was advised by the pathologist. He then underwent superficial parotidectomy with facial nerve preservation. Intraoperatively, there was well-encapsulated tumour measuring 2 x 3 cm and multiple intraparotid lymph nodes. All the lymph nodes were dissected out. Post-operatively transient right facial nerve paresis was noted. Histopathological examination of both the parotid tumour and cervical lymph nodes showed features of chronic granulomatous inflammation consistent with cat-scratch disease. Upon inquiry, the boy confirmed having cats at home and frequently plays with them. On follow up at six weeks, he was well. Facial nerve was normal and no recurrence of parotid swelling.

DISCUSSION
Bartonella henselae, a pleomorphic gram-negative rod is the causative agent for the well-recognized, benign, and self-limited cause of lymphadenitis in children referred to as cat-scratch disease (CSD). B henselae usually originates from infected kittens and is transmitted through a scratch or break in the skin6 that is often recalled only in retrospect as shown in our case. In a small percentage of patients with cat scratch disease there is no history of contact with animals.6,7 The common flea is usually the vector of transmission.9

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The accurate diagnosis of cat-scratch disease based on clinical and histopathological findings. Clinical presentation and physical examination findings provide pertinent information in accurately diagnosing CSD, by doing so, preventing unnecessary surgery and risk to the patient. The standard for diagnosis includes three of the following four diagnostic criteria: lymphadenopathy (localized or regional), recent cat contact, inoculation site identification, and positive enzyme-linked immunosorbent assay (ELISA) or indirect fluorescence antibody (IFA) studies. ELISA and IFA for detection of serum antibody to antigens of *B. henselae* are the most accurate diagnostic test and the most widely used test to confirm the diagnosis of CSD. A single elevated antibody titer is sufficient to confirm the diagnosis, because the humoral immune response precedes or is concurrent with symptom onset. Cat scratch disease may be more prevalent than realised, and an unnecessary biopsy may be avoided on the basis of serology results. In certain cases biopsy and histopathological examination are required to confirm the diagnosis and to rule out malignancy.

Surgical excision is the most common diagnostic measure and is often also therapeutic. Standard CSD treatment does not exist. The treatment depends on the presentation and individualize to the presenting case and patient's age. Treatment consist mainly of supportive therapy and reassurance. No antimicrobial therapy is required in the majority of cases of cat scratch disease, since adenopathy is usually self-limited. However, an atypical presentation may require antibiotic therapy. The use of antibiotics in cat scratch disease with lymphadenopathy and no systemic symptoms remains controversial, although some benefit in the reduction of lymph node size has been shown with azithromycin. Steroids have not been shown to be effective.

### REFERENCES

Platysma Flap in Oral Cavity Reconstruction

Primuharsa Putra SHA, MD, MSurg ORL-HNS,1 Marina MB, MD, MSurg ORL-HNS,2 Roszalina R, FDSRCS, FFDRCS,3 and Ridzo Mahmud, MSurg ORL-HNS, FRCS4

ABSTRACT
A retrospective analysis of our experience with 4 patients who received a platysma myocutaneous flap for reconstruction of tongue defects is presented. All patients had squamous cell carcinoma of the tongue, with tumour size ranged from T2 to T4 and their nodal status ranged from NO to N3. Intraoperatively, 3 patients had facial artery preservation and 1 patient had ligation of the facial artery. The average hospital stay was 11-16 days. There was 1 flap-related complications-fistula formation. This fistula resolved with local care only. Their speech and swallowing function was fairly good. Adjuvant postoperative radiotherapy was given to 3 patients. These results indicate that the platysma myocutaneous flap is an excellent reconstructive option for oral cavity defects. KPJ Medical Journal 2010; 4:35-36

Key words : Platysma myocutaneous flap, tongue reconstruction.

INTRODUCTION
The platysma myocutaneous flap (PMF) is seldom used for oral cavity reconstruction, as the radial forearm free is favored by most head & neck surgeons. However, there are several reasons why this flap should remain in our armamentarium of reconstructive options. The (PMF) is thin, pliable and reliable. The color match to facial skin, easy and time saving harvest. The donor site can be closed primarily with minimal morbidity. Additionally, microvascular surgeons are often unwilling or unavailable to perform free tissue transfer.

MATERIAL AND METHODS
From 2001-2004, 4 patients (Table 1) received a platysma myocutaneous flap in a single stage primary procedure at Department of Otorhinolaryngology-Head & Neck Surgery, Faculty of Medicine/ Hospital Universiti Kebangsaan Malaysia. The patients consisted of 3 male and 1 female, with the age range between 21 and 65 years. All patients had squamous cell carcinoma of the lateral border of tongue, with tumor size ranged from T2-T4 and their nodal status ranged from NO to N3. None of the cases had undergone preoperative radiotherapy. All patients had hemiglossectomy combined with either radical or modified neck dissection. In all cases the resection margins were at least 2 cm from tumour and all intraoperative frozen section reported as all margins are clear. In three of the cases midline mandibulotomy was performed to facilitate reconstruction. Facial artery was identified and preserved in 3 cases.

RESULTS
All subjects were eventually able to begin oral feeding within 4 to 5 weeks and were able to communicate verbally with only minor difficulty. Only one patient developed a fistula which was successfully treated conservatively for 2 weeks. None of the cases developed flap necrosis. Average hospital stay ranged from 11 to 16 days. There were no returns to the operating room or need for additional reconstruction. All subjects was given a course of radiotherapy postoperatively. One case had residual tumour and 1 had recurrence 9 months after surgery despite radiotherapy treatment. The other 2 cases were well and had no recurrence after 16 and 12 months.

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The platysma is a thin broad sheet of muscle investing the anteromedial aspect of the neck. It originates from the fascia over the upper parts of the pectoralis major and deltoid muscles. It inserts into the skin and subcutaneous tissues of the lower face.

The submental artery which is a branch of the facial artery was the primary vessel to the platysma. The submental artery flap can be dissected to the facial artery and that this flap also can be based superiorly or inferiorly because of the rich collateral circulation in the head and neck, thereby extending the length of the pedicle and hence the reach of this flap. Previous report stated that an intact facial artery is crucial to assure flap survival. We had ligated facial artery in one of our patient and we did not encounter any problem. Huwirtz et al performed a detailed study of the blood supply of the platysma muscle and found that an intact facial artery is not crucial to the survival of the flap. This conclusion was supported by others.

Platysma flaps have many advantages. The thinness and pliability of the muscle and skin paddle make it ideal for all positions in the oral cavity, where avoidance of excessive bulk is desirable, particularly in the floor of the mouth and gum regions. There is negligible functional impairment of deglutition, speech, and denture fitting. It can be harvested with enough tissue to close most head & neck ablative defects (at least 70 cm²). There is virtually no donor site morbidity involved. No special special skill, equipment, or technique is required for platysma flap design and harvest. The disadvantages of platysma flaps are relatively few. The reach and tissue bulk provided are limited.

Reported contraindications to the use of the platysma myocutaneous flap have included prior neck dissection and preoperative irradiation. None of our patient had preoperative irradiation. No adverse effect could be demonstrated by administration of preoperative chemotherapy. Large tumour size or invasion of adjacent structures was not a contraindication to the use of the platysma myocutaneous flap. A lip-splitting extension of the apron incision, segmental or marginal mandibullectomy also can be used if required for tumour resection without jeopardizing the vascularity of the flap.

Among complications reported in the literature are partial flap necrosis involving the epithelium alone, skin necrosis of the neck suture line, and fistula formation. Most of the complications resolved with local care only.

The platysma flap is an excellent reconstructive option for oral cavity defects. Our result shows the reliability and versatility of the platysma flap and indicates that the flap can be used without significant morbidity.

### REFERENCES

Fever of Unknown Origin: Consider Adult Onset Still’s Disease

Ramanathan M, MBBS, FRCP

ABSTRACT
This report deals with a young woman with persistent fever whose cause remained elusive for a long time. By exclusion she was found to suffer from Adult-onset Still’s Disease (AOSD). She responded well to appropriate therapy but her fever returned whenever she defaulted follow-ups! The report highlights some of the difficulties encountered in making the diagnosis of AOSD as there are no specific pathognomonic features of the syndrome. KPJ Medical Journal 2010; 4:37–40

Key words: pyrexia of unknown origin, Still’s rash, poyarthritis, hyperferritinaemia.

INTRODUCTION
Despite rapid advances in medical technology, fever of unknown origin (FUO) continues to remain a major problem in Medicine. Amongst its numerous causes, Adult-onset Still’s disease (AOSD) tends to tax the clinician’s ingenuity to diagnose the syndrome as illustrated by the patient presented here.

CASE REPORT
A 29-year-old police officer was admitted to the centre in September 2005 with fever and joint pains.

She was well till three months prior to admission when she developed fever and multiple joint pains. The fever was intermittent and was associated with constitutional symptoms. There was some undocumented weight loss. She had earlier consulted several general practitioners and was treated symptomatically. A month earlier she was admitted to another hospital for two weeks and was discharged home without specific conclusions.

During her present admission she was febrile with the temperature spiking to 39-40°C on and off in the ward. She appeared relatively well in between her febrile episodes. The proximal interphalangeal (PIP) and wrist joints were swollen and tender. The physical examination was otherwise unremarkable.

The results of the routine blood counts, liver function tests, creatine kinase (CK) and lactate dehydrogenase (LDH) are shown in Table I. Blood culture was negative. The x-rays of the hands and chest were also normal. The rheumatoid factor, anti-nuclear factor, thyroid function tests, renal and lipid profiles as well as urinalysis were either normal or negative. She tested negative for human immunodeficiency virus infection. Hepatitis panel including B and C was negative. Venereal Disease Research Laboratory (VDRL) test was also negative.

She was treated symptomatically with diclofenec sodium while waiting for her septic workout to return. On the second day into admission, prednisolone was prescribed as her joint pain was rather excruciating. She felt well two days later and insisted on discharge from the centre but promised to return for review in the clinic. She did not do so.

She was readmitted to the centre a month later. She again complained of fever on and off for ten days. Her joint pain too had recurred. During this admission her knees and elbows too were involved. At the same time she was noted to have a transient rash over her anterior abdominal wall and arms. The rash was not itchy and the patient was not really concerned.

The clinical examination was almost identical to her earlier admission except for mild effusion into her knees. On closer examination even though the patient was of darker complexion, the rash was found to be the classical evanescent rash one sees in patients with Still’s disease. Table 1 shows some of the routine blood counts done. Besides, the septic workout was again negative. The anti-nuclear factor, extractable nuclear antigens and the rheumatoid factors were negative. C - reactive protein was markedly high at 94.9 mg/L (Normal: <1.0).

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Based on her clinical features and review of the laboratory evaluations done earlier and the current admission she was diagnosed as a case of AOSD. She was treated with indomethacin, prednisolone, hydroxychloroquine, methotrexate (MTX) and folic acid supplement. She had prompt response to the treatment and was discharged from the centre a week later. She returned for review two weeks later. She was well. Steroids were stopped. She was asked to continue her hydroxychloroquine and take the indomethacin on a prn basis. She was subsequently lost to follow-ups.

She was readmitted for the third time almost seven months later in May 2006. She was very ill and appeared cachexic. She could not even speak because of pain in her temporomandibular joints. The history was from her mother. She was well for a short while after she stopped her medications. She was then transferred to another state. There her fever and joint pain recurred. She was admitted to a tertiary care hospital for further evaluation. She was in the hospital for about three weeks where she underwent several tests by different specialties. She was advised on the need for bone marrow and liver biopsy at that hospital; both of which she refused. She then discharged herself against medical advice to consult traditional healers. As her condition deteriorated after a week at home she was brought to the centre.

She had marked tenderness and mild swelling of her PIP, wrists, knees and elbows. Temperature was 40°C. The classical rash was again seen. Besides she also complained of right chest pain which was pleuritic in nature. She was also very irritable and insisted on treatment without waiting for even the routine blood tests to return. Table 1 shows some of the blood tests done during this admission. The septic workout was again negative.

She was started on a three day pulse therapy of IV methylprednisolone at 1gm daily. She was in addition started on MTX, hydroxychloroquine and folic acid supplements.

She was well two days later. She then produced a summary of the various tests done at the previous hospital. The routine blood counts were almost similar to what we had recorded here especially her total white cell counts, platelets and ESR were high. Besides an entire septic workout including several blood cultures was negative. The lupus screening was also negative. The chest x-ray, ultrasound of the abdomen, computed tomographic scan of the abdomen and chest were also normal. A transthoracic (TTE) as well as a transoesophageal echocardiograms (TEE) were also normal.

She was discharged from the center after a week. She was seen regularly in the clinic for almost six months. The steroids were tapered off. She was continued on weekly MTX, hydroxychloroquine and folic acid supplements. She then defaulted!

<table>
<thead>
<tr>
<th>Date/Test</th>
<th>09/2005</th>
<th>10/2005</th>
<th>05/2006</th>
<th>Normal values (where applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>102 g/L</td>
<td>98 g/L</td>
<td>86 g/L</td>
<td>115-165</td>
</tr>
<tr>
<td>White cell count</td>
<td>14.8 x 10⁹ /L</td>
<td>11.5 x 10⁹/L</td>
<td>16.4 x 10⁹/L</td>
<td>4.0-11.0</td>
</tr>
<tr>
<td>Differential count</td>
<td>Neutrophils 83%, Lymphocytes 14%, Monocytes 3%</td>
<td>N80%, L 16%, M 4%</td>
<td>N 88% L 8% M 4%</td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td>453 x 10⁹ /L</td>
<td>470 x 10⁹/L</td>
<td>653 x10⁹/L</td>
<td>150-450</td>
</tr>
<tr>
<td>ESR</td>
<td>130 mm/hour</td>
<td>131 mm/hour</td>
<td>&gt; 140 mm/hour</td>
<td>&lt; 21</td>
</tr>
<tr>
<td>Liver Function:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Protein</td>
<td>81 g/L</td>
<td>Not available</td>
<td>80 g/L</td>
<td>60-82</td>
</tr>
<tr>
<td>Albumin</td>
<td>36 g/L</td>
<td>Not available</td>
<td>29 g/L</td>
<td>35-50</td>
</tr>
<tr>
<td>Globulin</td>
<td>45 g/L</td>
<td>Not available</td>
<td>51g/L</td>
<td>20-39</td>
</tr>
<tr>
<td>Alkaline Phosphatase</td>
<td>133 U/L</td>
<td>Not available</td>
<td>126 U/L</td>
<td>30-120</td>
</tr>
<tr>
<td>Total Bilirubin</td>
<td>8 umol/L</td>
<td>Not available</td>
<td>7 umol/L</td>
<td>21</td>
</tr>
<tr>
<td>AST</td>
<td>51 U/L</td>
<td>Not available</td>
<td>62 U/L</td>
<td>&lt;41</td>
</tr>
<tr>
<td>ALT</td>
<td>52 U/L</td>
<td>Not available</td>
<td>22 U/L</td>
<td>&lt;51</td>
</tr>
<tr>
<td>Creatine kinase (CK)</td>
<td>19 U/L</td>
<td>Not available</td>
<td>Not available</td>
<td>&lt; 201</td>
</tr>
<tr>
<td>LDH</td>
<td>353 U/L</td>
<td>Not available</td>
<td>348</td>
<td>110=240</td>
</tr>
<tr>
<td>Ferritin</td>
<td>Not available</td>
<td>3628ug/L</td>
<td>2971ug/L</td>
<td>10-120</td>
</tr>
</tbody>
</table>
DISCUSSION

The concept of FUO was first introduced by Petersdorf and Beeson in 1961.\(^1\) They defined FUO as fever of more than 38.3ºC on several occasions lasting more than 3 weeks for which a cause remained elusive after a week of investigations. The original definition has undergone some modifications. It is now an accepted practice to carry out the initial investigations in an out-patient clinic. Debate however still continues as to what should be the minimum level of investigations required before labeling a particular patient as a case of FUO.\(^2\)

Amongst the numerous causes of FUO, AOSD has some very unique features. AOSD first described by Eric Bywaters in 1971.\(^3\) It is a rare systemic inflammatory disorder of unknown aetiology. AOSD is a diagnosis of exclusion. There are no specific clinical or laboratory findings which can conclusively point towards the diagnosis. Diagnosis can thus be easily missed. This has led several workers to propose clinical and laboratory criteria to be met with before arriving at the diagnosis of AOSD\(^4\) (Fig. 1). Our patient illustrates some of the problems one encounters in diagnosing AOSD.

Although our patient ultimately met with most of the criteria for AOSD one cannot expect to see the entire clinical expression of AOSD during a single febrile episode.\(^5\) Our patient’s tendency to default as well as keep changing her physicians posed problems in collecting the necessary historical data to diagnose AOSD. One usually generates a gamut of possibilities in a particular case before confirming AOSD. Fig. 2 shows the various diagnostic possibilities considered in this patient.

The initial clinical impression in this patient was one of either rheumatoid arthritis or acute rheumatic fever. Both the possibilities were excluded only on reviewing the subsequent clinical and laboratory findings. The classical evanescent rash was only noted during her second admission. Even then the rash could have been easily dismissed as a drug reaction!

The excellent clinical and laboratory summary provided by the other hospital was very helpful in excluding some of the common causes of FUO including infective endocarditis, lymphoma intrabdominal abscess and tuberculosis. Serological markers were repeatedly negative for lupus.

The only possibility left on the slate was AOSD. Our patient met with almost all of the proposed criteria for AOSD. In addition her ferritin level was very high on both the occasions it was done. Hyperferritinaemia has been reported in more than 90% of cases of AOSD. At the moment raised serum ferritin level is not a requisite for the diagnosis of AOSD. In view of no other specific or sensitive test for AOSD, some workers recommend that hyperferritinaemia should be considered as an important diagnostic and disease activity marker in AOSD.\(^6,7,8\)

Further the persistent thrombocytosis, raised ESR and the pleuritic pain she had during her last admission have been reported in patients with AOSD.\(^7,8\)

Treatment strategies in AOSD have been mainly empirical in nature. The rarity, heterogeneity and the difficulty in diagnosing early AOSD have prevented from initiating prospective controlled treatment trials to provide evidence based approach to its treatment. Current therapeutic strategies are based on case reports and retrospective studies of small case series.\(^7,8,9\)

Nonsteroidal anti-inflammatory agents (NSAIDS) with glucocorticoids have been the mainstay of treatment. NSAIDS are useful in mild self limiting group of patients. The next step on the treatment ladder is the disease modifying antirheumatic drugs (DMARD), especially MTX. About 70% of patients have been reported to benefit fully or partly from MTX.\(^8\)

The patient under discussion was on steroids during all her admissions. Almost all AOSD patients have been known to require steroids at some point in the course of their illness. While steroids are certainly useful, their side effects in the long term administration cannot be ignored. These agents are particularly known to cause joint destruction in AOSD.\(^7,8\)

The field is open for patients who are refractory to NSAIDS and DMARD. The drugs advocated

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**Fig. 1. Diagnostic criteria for AOSD\(^4\)**

<table>
<thead>
<tr>
<th>Major:</th>
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<tbody>
<tr>
<td>1. Arthralgia &gt; 2 weeks.</td>
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<tr>
<td>2. Fever &gt; 39º C; intermittent, &gt;1 week.</td>
</tr>
<tr>
<td>3. Typical rash</td>
</tr>
<tr>
<td>4. WBC &gt; 10,000 (&gt;80% granulocytes)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minor:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sore throat.</td>
</tr>
<tr>
<td>2. Lymphadenopathy and/or splenomegaly.</td>
</tr>
<tr>
<td>3. LFT abnormal</td>
</tr>
<tr>
<td>4. (-)ve ANA and RF.</td>
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</tbody>
</table>

**Diagnostic combination**

<table>
<thead>
<tr>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infections</td>
</tr>
<tr>
<td>3. Rheumatic diseases.</td>
</tr>
</tbody>
</table>

**Diagnosis:**

5 criteria (at least 2 major).

---

**Fig. 2. Diagnostic possibilities considered in this patient**

1. Rheumatoid arthritis.
2. Rheumatic fever.
5. Lymphoma.
6. Infective Endocarditis.
7. Intraabdominal abscess.
8. Tuberculosis.
for these patients include immunosuppressants, human immunoglobulin (IVIg), lefunomide and anti-TNF agents like infliximab and etanercept. Another drug that has been reported to be promising is the ILI blocker, anakinra. 7,8,9

CONCLUSION

The take home point for the clinician is until definite evidence based guidelines are available; AOSD patients should initially be tried on NSAIDS, steroids and DMARD. If these modalities fail, then one might choose one of the above mentioned drugs taking into consideration the availability, familiarity, side effect profiles and cost of the agent chosen.

Prognosis is variable in AOSD. Three distinct patterns have been recognized.8 Some patients tend to go into active remission within a year. The second category of patients tends to have a polycyclic or intermittent systemic pattern with flares on and off. The last group of patients has chronic joint problems. They are prone to joint destruction and 67% of this group went through joint replacement in at least one joint after a mean of 28 months from the time of diagnosis.10

The patient under discussion when last reviewed was thought to fall into the second group. But as she has not come for any follow up for almost two years now it is difficult to spell out the exact prognosis in her.

REFERENCES

The Novel Influenza A (H1N1) Infection in Infants and Children

Musa Mohd. Nordin, FRCP, FAMM

INTRODUCTION

During the 1918 Spanish Flu pandemic, often described as the most devastating epidemic in recorded history, 1 in 5 person was infected and an estimated 50 million lives were lost.\(^1\) The disease was so widespread and pervasive that even children had a tune which they skipped rope to: “I had a little bird, its name was Enza, I opened the window and In-Flu-Enza.”

EPIDEMIOLOGY

Past pandemics and the seasonal influenza have always placed children, especially those less than two years old at increased risk of influenza related morbidity and mortality. Analysis of 7,706 confirmed cases of the Novel Influenza A (H1N1) from 28 countries in the European Union up to 6 June 2009, showed that 54% of the cases occurred in children and young adults under 20 years of age (22% in children under 10 years).\(^2\) A report of 642 confirmed cases of Influenza A (H1N1) in the USA showed that 60% of cases were in the paediatric population less than 18 years (20% in under 10 year olds).\(^3\)

This may suggest that the younger population are more biologically susceptible to the virus than older persons. Their mobility and travel may also predispose them to the virus. Some researchers have shown that 1 in 3 persons aged above 60 years have pre-existing cross reactive antibodies, which may explain why only 4% and 5% in the European and American Influenza A reports respectively, were in those more than 50 years old.

CLINICAL MANIFESTATIONS

Children are afflicted by many respiratory illnesses and it may be very difficult to distinguish more common acute respiratory tract infections from the Novel Influenza A infection. Besides, children are less likely to present with the classical symptoms of Influenza A infection, namely high grade fever, sore throat, cough, difficulty breathing, headache and myalgia.

Infants may present to the health care worker (HCW) with fever and lethargy, maybe poor feeding and diarrhea and vomiting (acute gastroenteritis being a more common explanation) and no other symptoms or signs related to the respiratory tract. A high index of suspicion is required to make the diagnosis especially if there is a travel history or contact with a case. Interestingly, 25% in the American and 14% in the European cohort of Influenza A patients had symptoms (diarrhea and vomiting) related to the gastro-intestinal tract which is not typically found in seasonal influenza.

Unless early diagnosis is made, the child may deteriorate with symptoms and signs of severe disease which includes; cessation of breathing, rapid breathing, difficulty breathing, turning blue, dehydration, altered consciousness and irritability.

RISK FACTORS FOR SEVERE MORBIDITY OR MORTALITY

A subset of children who are at an even higher risk of influenza related complications includes the following:

a. Less than 2 years old.
b. Immunosuppression caused by medications or HIV.
c. On long term aspirin therapy.
d. Chronic pulmonary, cardiac, hepatic, haematological, neurological, neuromuscular or metabolic disorders,
e. Conditions such as cerebral palsy, intellectual and developmental disability, seizure disorders etc which may impair respiratory function.

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TRANSMISSION AND CASE FATALITY RATES

The Novel Influenza A (H1N1), which the WHO declared on June 11, 2009, as the causative strain of the first pandemic of the 21st century, bears a disturbing resemblance to the H1N1 virus strain which caused the 1918 flu pandemic and is affecting more younger than older people.4 Transmissibility of the Novel virus is also much higher than the seasonal influenza, and the estimated rates of human-to-human transmission is similar to the lower estimates of previous influenza pandemics. It has spread within a space of 6 weeks what the previous pandemics could only do in 6 months, facilitated by modern air travel.

Estimates of Case Fatality Rates (CFR) from the Novel Influenza A (H1N1) is lower than the seasonal flu (0.5-1%) which is lower than the Spanish Flu (2.5%) which is lower than the Avian Flu (50%). The European Centre for Disease Control & Prevention (ECDC) in its risk assessment report for H1N1 wrote; "a reasonable assumption is a hospitalization rate of 1-2% and CFR of 0.1-0.2%". This was in comparison to earlier estimates of 0.4% (4 in 1,000) based on data from Mexico.6 The high estimates from Mexico was probably related to it being a new illness not early and correctly recognized; delay in seeking medical attention and the quality of critical care afforded to the patients who often presented in a moribund condition. In the US alone, there are 200,000 influenza related hospitalizations annually and 36,000 influenza associated deaths during each influenza season. Though the disease severity and mortality rate is much less than the seasonal influenza, the virulence of the Novel Influenza A may change as it mutates and the permissive transmission will further facilitate and present opportunities for the Novel virus to replicate and reassort itself in new host species; potentially evolving into a more lethal virus which would have a significant impact on human history and the global economy.

CONTAINMENT AND MITIGATION PHASES

Global containment of the virus has failed and the WHO has stopped tallying laboratory confirmed cases as the increase is very rapid and the available resources could be better utilized. The most effective strategy to break this exponential chain of transmission and control the epidemic is through a mass vaccination program. The first pandemic vaccine trial in humans are underway in Australia and if found to be safe and effective, a mass immunization program will be launched, earliest before the end of 2009.7

SPECIAL CONSIDERATIONS FOR CHILDREN

Meanwhile, during the mitigation phase, various universal influenza pandemic preparedness programs have been implemented to decrease the global impact of this Novel virus. Measures specific to the health and lives of children include:

a. Focusing on children’s hygiene is one of the best way to reduce transmission of the flu virus. This is probably because children are very sociable and enjoys the most amount of physical contact with other people. Encouraging parents, teachers and day care workers to promote frequent hand washing and other good hygiene practices would go a long way towards mitigating this outbreak. In Pittsburgh, during the Spanish Flu pandemic, school children were given information to take home and warned not to gather in groups. A review of several published studies showed that frequent hand washing, using gloves, gowns and masks with filtration, and isolating probable cases helped to reduce transmission of viral respiratory diseases.

b. Children with confirmed or probable Influenza A infection and not sick enough to warrant hospital care should be home quarantined and all related public health measures should be strictly adhered.

c. Hospitals and Health Care Workers (HCW) are bearing the brunt of this added clinical burden. Triage at the entry points of all healthcare facilities are meant to timely identify suspected cases for clinical management and decrease the risk of transmission to other patients and HCW. Children should not be brought to hospitals and other healthcare facilities unless they are sick and require specific treatment. Do not be intimidated by HCW who are adorning masks, gowns and gloves because they are working in a high risk environment and require them for their personal protection. During the onset of the first outbreak in Mexico, in March-April 2009, 22 HCW developed influenza like illness (ILI) within 7 days of contact with the index patient and required treatment with oseltamivir.8

d. A whole host of non-pharmacological interventions were undertaken in 1918 to mitigate the impact of the influenza pandemic.9 These included the wearing of surgical masks, encouraging people to stay home, prohibition of public gatherings and the closure of schools. St. Louis in the US, which implemented an early and sustained strategy of school closures and cancellation of public gatherings did not experience as severe an outbreak when compared to other US cities. The WHO has recommended that the closure of schools is one of the mitigation measures that should be considered by countries if the pandemic continues to worsen.

e. Children are more likely to be sicker and die from the seasonal influenza than the Novel Influenza A. The seasonal influenza is preventable and all children should continue to get their annual seasonal flu shots. It is not expected to provide any substantial protection against the Novel Influenza
A virus. The US CDC recently extended the use of the influenza vaccine to children up to 18 years from the previous 6 months – 5 year olds. Those above 65 years and persons with co-morbidities were similarly listed as high priority for the influenza vaccination.

f. Parents should make sure that their children’s other immunizations are up to date. Many of the deaths during the 1918 pandemic were not directly caused by the H1N1 virus but were due to secondary bacterial pneumonia which set in after the virus had weakened the body’s defences. The most common bacteria isolated from ante-mortem and post-mortem specimens were the pneumococcus (50%), haemophilus influenza (25%), staphylococcus aureus and meningococcus. The pneumococcal conjugate vaccine (PCV), the 23-valent pneumococcal vaccine, the Hib vaccine and the quadrivalent meningococcal vaccine would help prevent against a big proportion of the killer co-pathogens.

g. Because children are particularly susceptible to the new flu virus, HCW may need to be especially alert to secondary bacterial infections in their narrower airways. The advent and availability of effective and affordable antibiotics against these bacterial superinfections has helped to reduce complications from influenza. If a child has had the flu for five to seven days and is not improving or getting worse, this is one situation where doctors would need to seriously consider prescribing appropriate antibiotics.

h. The Novel Influenza A (H1N1) virus is susceptible to the anti-virals, oral oseltamivir and inhaled zanamivir. They are most effective when commenced within 48 hours of developing ILI and administered for five days. Notwithstanding, many patients with Influenza A (H1N1) have recovered spontaneously without anti-viral treatment. The most common adverse effects of oseltamivir are nausea and vomiting which improves by taking it with food. Children with severe clinical illness, radiological abnormalities and other co-morbidities as outlined earlier should be considered for early anti-viral therapy.

i. Sometimes antivirals are given to otherwise well children who are known or strongly suspected to have been exposed to another person with the Novel Influenza A virus. This chemoprophylaxis with anti-virals is to prevent the child from becoming infected with the virus or to make the infection milder. Prophylactic oseltamivir is approved for children 12 months or older and should be started upon exposure and continued for 7 to 10 days, at a lower dose than for therapy. Zanamivir is approved for chemoprophylaxis in children 5 years or older.

CONCLUSION

Since its first appearance in April 2009, at the US-Mexican border, the Novel Influenza A (H1N1) has spread to over 160 countries, infected well in excess of 200,000 people and claimed more than 800 lives. The WHO on June 11, 2009, declared an influenza pandemic caused by this Novel strain. Children and young adults are more susceptible to the Novel strain than the elderly population. Though the clinical syndrome is relatively less severe than the seasonal flu, the human-human transmission of the strain is universal and exponential. Global Influenza Pandemic Preparedness plans are in place to mitigate the human and socio-economic impact of this Novel flu virus. No vaccine is presently available to prevent infection with the Novel virus, break its chain of transmission and to contain and control the epidemic. Human trials with the pandemic vaccine are now in progress and should be available for large scale immunization before the close of 2009.

REFERENCES

5. ECDC Interim Risk Assessent. Influenza A (H1N1) 2009 Pandemic. 20 July 2009.
The success of modern vaccines is one of the most extraordinary accomplishments of medical science. In earlier generations many children contracted communicable diseases like polio and whooping cough, frequently with devastating consequences. Some children died; others were left with permanent impairments, perhaps dependent on a wheelchair. But the development of vaccines has made many of these childhood illnesses relatively rare and has thus improved the lifetime health and well-being of millions of kids. Children have quite clearly benefited more from vaccines than from any other preventive public health program (other than clean water and sanitation) in history.\(^1\)

However, some parents have become complacent about their children’s immunisations. They have mistakenly presumed that these serious diseases have disappeared or have been eradicated. Others have been duped by the anti-vaccines lobby which though miniscule in numbers make up 80% of the “immunization websites” in cyberspace. We have become victims of our own success. Was it not George Santayana (1863-1952) who said, “Those who cannot remember the past are condemned to repeat it”.\(^2\)

A few parents have been frightened away by reports of possible side effects associated with certain vaccines and which have been blown out of proportion by the anti-vaccines groups. Evidence based vaccinology has clearly demonstrated that the risks of not receiving immunisations are immense. Today’s vaccines are safe and generally produce only mild side effects such as fever or localized redness. Severe adverse reactions are extremely rare.

For maximum effectiveness and protection, immunisations should be administered at particular ages. A child should receive most of his childhood immunisations before his second birthday which will protect him against 10 major diseases (Fig. 1):

- 3 doses of Hepatitis B
- 1 dose of Tuberculosis
- 5 doses of DTP (Diphtheria, Tetanus, Pertussis)
- 3-4 doses of Hib (Haemophilus influenza b)
- 5 doses of Polio
- 2 doses of MMR (Measles, Mumps & Rubella)

Immunisations are also available against a host of other communicable diseases including chicken pox, rotavirus gastroenteritis, influenza, pneumococcal infection, Hepatitis A and meningococcal meningitis. The optional vaccines are shown in Fig. 2.

The efficacy of vaccines in preventing life threatening disease is undisputable, but most parents remain concerned about subjecting their babies to many painful injections.

This has now been allayed by the availability of many combination vaccines. Six of the ten Ministry of Health vaccines are given in combination – DTP and MMR vaccines. A pentavalent vaccine (5 in 1 combo) and a hexavalent vaccine (6 in 1 combo) are now available.

These new combination vaccines will further decrease the number of individual shots that children would need. For a change, less pain but more gains!

The combining of vaccines in a single injection confers various benefits to the child and family. It is undoubtedly less painful (since less injections) to the child (and parents too!), more convenient to parents who are less likely to forget vaccination dates thus ensuring better compliance. This further enhances the success of the country’s vaccination program and the universal protection of all of our children.

Teenagers do not get routine medical checkups and hence are not very good about getting the vaccines they need. Parents of adolescents should make an extra effort to rectify this blind spot in vaccination. Fig. 3 summarises the recommended adolescent immunisation schedule.\(^3\)

Adults including grandparents should similarly review their vaccination status to ensure optimal and long term protection. Fig. 4 shows the recommended adult immunisation schedule.\(^4\)

This review attempts to summarise the choices that are best for our children and adolescents. And as parents and grandparents, we similarly need to update our own vaccination status to enhance our protection against various viruses and bacteria which are potentially life threatening or debilitating to our health.

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\(^{2}\)KPJ Selangor Specialist Hospital.

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Fig. 1. Immunisation schedule

<table>
<thead>
<tr>
<th>Immunisasi</th>
<th>Umur (Bulan)</th>
<th>Umur (Tahun)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>BCG</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Hep B</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>DTP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hib</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DT</td>
<td></td>
<td></td>
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<tr>
<td>T</td>
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</tr>
</tbody>
</table>

Fig. 2. Available vaccines

- 2-8 months: 2-3 doses of Rotavirus vaccine
- 2-24 months: 3 or 4 doses of Pneumococcal vaccine
- After 12 months old: Chickenpox vaccine
- After 24 months old: 2 doses of Hepatitis A
- After 24 months old: Meningococcal vaccine
- After 6 months old: Annual Influenza vaccine
- After 9 years old: 3 doses of Human Papillomavirus vaccine

Fig. 3. Adolescent immunisation schedule

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>11-18 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>Catch up 3 doses</td>
</tr>
<tr>
<td>Diphtheria, Tetanus, Pertussis</td>
<td>dTap (adolescent preparation)</td>
</tr>
<tr>
<td>Measles, Mumps, Rubella</td>
<td>Catch up 2 doses</td>
</tr>
<tr>
<td>Chicken Pox</td>
<td>Catch up 2 doses</td>
</tr>
<tr>
<td>Meningococcal</td>
<td>1 dose</td>
</tr>
<tr>
<td>Influenza</td>
<td>Annual dose</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Catch up 2 doses</td>
</tr>
<tr>
<td>Human Papillomavirus</td>
<td>3 doses</td>
</tr>
</tbody>
</table>

Fig. 4. Adult immunisation schedule

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19-49 years</th>
<th>50-64 years</th>
<th>&gt; 64 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetanus, Diphtheria, Pertussis</td>
<td>Tdap</td>
<td>Tdap</td>
<td>dT</td>
</tr>
<tr>
<td>Human Papillomavirus (HPV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, Mumps, Rubella (MMR)</td>
<td>Catch up 1 or 2 doses</td>
<td>Catch up 1 dose</td>
<td>Catch up 1 dose</td>
</tr>
<tr>
<td>Chicken Pox</td>
<td>Catch up 2 doses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td></td>
<td>1 dose annually</td>
<td></td>
</tr>
<tr>
<td>Pneumococcal (polysaccharide)</td>
<td>1-2 doses</td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Catch up 2 doses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Catch up 3 doses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal</td>
<td>1 or more doses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REFERENCES

Introduction to the Casemix Groups – Diagnosis Related Groups (DRGs)

Zafar Ahmed, MBBS, MBA

The Diagnosis Related Groups (DRGs) are a patient classification scheme that was originally developed as a means of relating the type of patients a hospital treats (i.e., its casemix or mixture of cases) to the costs incurred by hospitals. The initial motivation for developing the DRGs was firstly to develop a language that is common for all the players in a hospital setup, and secondly to relate the patients treated in a hospital with the resources they require to be treated. Therefore, it creates an effective framework for monitoring the utilization of services in a hospital setting.

Technically speaking, the casemix group is a patient classification that classifies patients into groups that are not only clinically similar (clinical similarity) and require similar amount of resources (resource homogeneity) to be treated in a hospital.

Initially this patient classification system, i.e., casemix system classifies only the patients that are admitted and treated in the hospital facility due to some acute problems. So DRG classification is meant for acute inpatient episodes only. But the later version of the casemix grouping like International Refined Diagnosis Related Group (IR DRG) can classify both inpatients as well as patients treated in the ambulatory setup as well.

Casemix groups, also known as Diagnosis related Groups (DRG) is a clinical classification, based on the diseases the patient is suffering from or the procedure that the patient has undergone. These clinical conditions form the basis of the groups they are aggregated in, which are further refined on the basis of resource homogeneity.

This clinical information is then combined with other patient related information to assign the patient into a specific DRG. The other patient related information needed to assign DRG is age, gender, LOS, discharge status (what happen to patient when he goes out of the hospital) etc. Before the patient related clinical information (diagnosis of the patient and the procedure he has undergone) can be used to assign DRG, it should be converted from free text diagnosis into coded information.

The process of converting the free text diagnosis and procedures into codes is called clinical coding, and is being done by trained clinical coder in the medical record department using international conventions. The convention adopted by the Ministry of Health Malaysia for the disease coding is ICD 10, whereas for procedure it is ICD 9 CM.

The data requirement for the development of DRG based casemix groups is shown in Fig. 1.

![Fig. 1. Data required for DRG](image)

<table>
<thead>
<tr>
<th>NO</th>
<th>Data Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Patient Identifier</td>
</tr>
<tr>
<td>2</td>
<td>Patient Age in years</td>
</tr>
<tr>
<td>3</td>
<td>Patient Age in days (if less than one year)</td>
</tr>
<tr>
<td>4</td>
<td>Patient Gender</td>
</tr>
<tr>
<td>5</td>
<td>Patient Discharge disposition / status</td>
</tr>
<tr>
<td>6</td>
<td>Patient weight (if age is less than 7 days)</td>
</tr>
<tr>
<td>7</td>
<td>Patient Principal Diagnosis</td>
</tr>
<tr>
<td>8</td>
<td>Patient Secondary Diagnosis</td>
</tr>
<tr>
<td>9</td>
<td>Patient Principal Procedure</td>
</tr>
<tr>
<td>10</td>
<td>Patient Secondary Procedure</td>
</tr>
</tbody>
</table>

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All these data elements are available in the patient medical record. Once these entire data element are extracted from the patient record, these are compiled in a fix format in a ‘text’ (.txt) file, and run through the software to assign DRG based on the logic of the casemix system. The process is summarized (Fig. 2).

Once the DRG groups are created they can be used for complimenting many processes in the hospital environment. For example:

- Management
- Budgeting
- Profiling
- Benchmarking
- Clinical research
- Quality reporting
- Global Use
- Payment

**CONCLUSION**

DRGs are one of the most important health management tool developed in the last century. It can be used both for clinical as well as management environment with great ease and good results.

**REFERENCE**

Radiological Quiz: A 20 Month Old Girl with Fever and Irritability

Nurhayati Mokhty, MD, MMed

A 20 month old girl presented with fever, irritability and inability to walk. What is the diagnosis?

Fig. 1. Plain Radiography

Fig. 2. CT Scan

Fig. 3. MRI Scan

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DISCUSSION

Findings:

1. Plain Radiography (Fig. 1)
   Disc space narrowing at L4/L5.

2. CT Scan (Fig. 2)
   Lucent lesion within the L5 vertebral body with cortical destruction and irregular margins.

3. MRI Scan (Fig. 3)
   T2 prolongation within the anterior right L5 vertebral body, which extends to the L4-L5 disc space. There was no corresponding enhancement on the post contrast images. There is soft tissue in expansion at the L5 level.

DIAGNOSIS

Osteomyelitis/discitis of lumbar spine.

Key points - osteomyelitis of vertebrae:

- In children the most common cause of osteomyelitis is by hematogenous spread from a remote source.\(^1\)
- Acute hematogenous osteomyelitis, despite its name, may have a slow clinical development and insidious onset.
- In general, osteomyelitis has a bimodal age distribution.
  - Acute hematogenous osteomyelitis occurs early in life, usually in children.
  - Conversely, direct trauma and contiguous focus osteomyelitis are more common among adults and adolescents than in children.\(^2\)
- Symptoms in acute hematogenous osteomyelitis are insidious in onset and include: History of acute bacteremic episode, local edema, erythema and tenderness.
- The most common causes in the 4-month to 4-year age group are Staphylococcus aureus, group A Streptococcus species, Haemophilus influenzae, and Enterobacter species.
- The WBC count may be elevated, but it is frequently normal. Other diagnostic clues are elevated ESR (usually elevated in 90%) and elevated C-reactive protein. Both are nonspecific findings. However, C reactive protein may be more useful than the erythrocyte sedimentation rate, since it is elevated earlier than the erythrocyte sedimentation rate (ESR).
- Plain film findings:
  - Acute osteomyelitis is first suggested by overlying soft-tissue edema at 3-5 days after infection.
  - Bony changes are not evident for 14-21 days and initially manifest as periosteal elevation followed by cortical or medullary lucencies. By 28 days, 90% of patients demonstrate some abnormality.
  - Approximately 40-50% focal bone loss is necessary to cause detectable lucency on plain films.
- CT Scan:
  - Soft tissue swelling.
  - Periosteal elevation.
  - Cortical destruction or medullary lucencies.
- MRI Scan:
  - The MRI is effective in the early detection.
  - MRI findings in osteomyelitis are deceased marrow signal on T1W images and iso to hyper intense signal intensity on T2W images.
  - Sensitivity ranges from 90-100%.

REFERENCES