Emergency surgery: measure, change and benefit

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ABSTRACT

Background
Emergency surgery comprises a large part of surgical services. However, it rarely has received the attention that surrounds waiting list management and elective surgery.

Objective
This article identifies principles for models of emergency surgery care and describes the redesign of emergency surgery for the benefit of nurses, surgeons and patients.

Setting
The redesign of emergency surgery services in New South Wales.

Primary argument
Nurses understand the many challenges in delivering care to emergency surgery patients. Access to operating theatres, surgeon availability and frequent reworking of operation schedules are but some of the issues that impinge on the nurse's ability to deliver quality, planned and organised care to emergency surgery patients.

The development of the NSW Health *Emergency Surgery Guidelines* provides nurses with an opportunity to actively contribute to the redesign of emergency surgery. The principles of emergency surgery redesign described in the *Guidelines* address all the major problems in emergency surgery care.

Conclusion
The nursing benefits include improved access to consultant surgeons for patients, nurses and junior doctors, the alignment of surgeons to emergency surgery theatre time and a coordinated approach to the delivery of emergency surgery in a hospital or across a network of hospitals. Nurses will also benefit from a defined career path in emergency surgery, a coordinated approach to a previously unplanned workload and opportunities for career advancement in a previously professionally unstructured specialty. It is crucial nurses participate actively in emergency surgery redesign.

INTRODUCTION

Emergency surgery is often considered to be the 'fly in the ointment' when scheduling operative surgery lists as it frequently interferes by 'bumping' cases on the elective lists. The emergency case is managed rather as an after-thought and is frequently scheduled only when time and operating theatre sessions permit. Rarely, is there sufficient sessional operating theatre time allocated to deal with the emergency surgery load and so emergency cases go well into the night or into early hours of the morning when there is no competition with elective lists for theatre time.

Nurses working in the emergency department, operating theatres and surgical wards will recognise the many challenges in delivering peri-operative, intra-operative and post-operative nursing care to emergency surgery patients. Access to operating theatres, misalignment of operating time to surgeon availability, regular after-hours operating and frequent reworking of operation schedules are some of the issues that are familiar to nurses and impinge on their ability to deliver quality, planned and organised care to emergency surgery patients.

The perception that emergency surgery is random and erratic in presentation to hospital and therefore cannot be properly managed is simply incorrect. Emergency surgery is predictable and highly amenable to planning (New South Wales Department of Health 2009). Unfortunately, it has rarely gained the benefits of systematic planning.

New South Wales (NSW) Health, in conjunction with the Surgical Services Taskforce (SST) have developed and published the *Emergency Surgery Guideline* (New South Wales Department of Health 2009). These guidelines set out the principles of emergency surgery management and provide examples of models of care that will assist hospitals to enhance their management and delivery of emergency surgery.

Implementation of the *Emergency Surgery Guidelines* provides nurses with an opportunity to actively contribute to the redesign of emergency surgery. Nurses have a crucial role in establishing the most appropriate model that will enhance the management of emergency surgical patients in their facility.

This article outlines the principles of emergency surgery redesign and the main components of the redesign that will provide benefit to hospital nursing staff and their emergency surgery patients.

Principles of emergency surgery management

Emergency surgery is reasonably predictable over a period of time in terms of its volume, complexity and the type of emergency conditions presenting. While most operating theatre staff are resigned to the common practice of scheduling emergency surgery operations after standard theatre hours, much of that surgery can actually wait until standard hours later that day or the following day without detriment to the patient's clinical condition. In fact, many patients can be better prepared physiologically when the operation is planned ahead during standard hours rather than during the middle of the night (Adie et al 2009). Patients may also receive information and education pertinent to their condition, which is often not delivered after-hours due to lack of time or access to specialist staff. This preparation time can deliver a patient who is better prepared for their operation both physically and psychologically.

The main barrier to accessing operating theatre sessions during standard hours is a lack of planning for the predictable emergency surgery load. In planning for emergency surgery, a number of principles should be applied.

They are:

- scheduling operating theatre sessions during standard hours where clinically appropriate;
- balancing the required operating theatre sessions by including their emergency surgery load;
- matching the resources in terms of staffing, equipment and funding required for both planned and emergency surgery; and
- establishing consultant-led models of emergency surgery care.

The NSW *Emergency Surgery Guidelines* identify the processes involved in applying these principles to emergency surgery redesign, appropriate for any

hospital receiving emergency surgery patients. Of particular importance, is the measurement of the emergency surgery load by sub-specialty and the subsequent calculation of the required operative sessions to manage the estimated load. The appropriate models of care for emergency surgery can then be determined and the *Guidelines* provide a number of suitable models depending on the load and designation of the facility.

Application of the principles of emergency surgery redesign has consequences for nursing and provides significant opportunities to enhance and improve the surgical nursing management of the emergency surgery patient.

Standard hours scheduling

Patients whose condition is limb or life-threatening need operative intervention as soon as possible as dictated by their clinical presentation. This does mean for some patients that their urgent operations will be undertaken at any time regardless of day or night. Adequate operating theatre access must always be available to enable this small proportion of emergency surgical work to be performed without delay or compromise. It is imperative that this system of care continues with a high degree of responsiveness to ensure preservation of life and limb.

The decision to operate after-hours should be based on whether the patient will be clinically compromised if they do not receive an urgent operation. It should not be undermined by a lack of access to standard-hours operating theatre sessions.

Clinical conditions that are neither life nor limb-threatening can generally be scheduled for sessions made available during standard hours. A considerable amount of emergency surgery can in fact wait until daylight hours without detriment to the patient's condition (Adie et al 2009; Deane et al 2010). For operating theatre nurses, this means managing emergency patients in a manner similar to planned admissions. This also provides operating theatre nurses with roster certainty for the emergency surgery sessions, reduces overruns from elective lists due to unplanned additions, improves skill mix in the operating theatre and provides experience for the nurses allocated to emergency sessions (Willis et al 2010). This is important for nurses and theatre managers, as night duty is traditionally the least popular and most difficult shift to staff.

Surgical wards are generally staffed at their leanest overnight. Reducing the after-hours theatre activity will reduce the burden for the ward staff of preparing and receiving post-operative patients overnight and will minimise the disturbance of other ward patients.

Night duty itself compounds patient management for nursing staff. Locating dressings or equipment used infrequently, ordering urgently required non-stock clinical items or administering medications not available in that specific ward area is a source of frustration and is very time consuming after-hours. If the amount of surgery performed after-hours can be reduced this will ensure night duty is less stressful and more patient focussed.

Access to nurse educators and clinical nurse consultants is traditionally more difficult for nursing staff working after-hours. In many hospitals, night shift nurses have limited or no access to specialist education. Stomal nurses, diabetic educators and wound care specialists are just some of the specialty educators that are unavailable to night duty nurses. As a result, the credentialing and accrediting of permanent night duty nurses in extended skills, such as central line management, pain management systems and specific therapeutic regimes is difficult and occasionally neglected.

Load balancing/operating theatre sessions

Once the amount of emergency surgery that is managed in each hospital is measured for each sub-specialty, the required sessions in standard hours can then be estimated. This calculation should take into account the necessary adjustments in procedure times for surgical trainee teaching. There are different models for planned and emergency theatre access that can be integrated into theatre schedules[4]. These different models are important as they describe possible theatre configurations for varying volumes of emergency surgery. Acute Surgery Units (ASU), mixed emergency and elective sessions, designated emergency and elective sessions and evening or 'twilight sessions' are some of the identified models (table 1).

Table 1: Models of emergency surgery care[4]

Model	Key features	Suitability	Working Example
Acute Surgery Unit (ASU)	• Consultant surgeon led with consultant surgeon on site in standard operating hours • Consultant rostered on with no other commitments during period as rostered as ASU surgeon • Dedicated emergency theatre sessions in standard operating hours • Surgeon control of case priority in operating room sessions • Surgeon present, teaching, and supervising when surgery is being performed • ASU team (Registrar, RMO, CNC) • Agreed clinical guidelines for common emergency surgical admissions • Formalised handover process • Designated beds or ward for assessment and management of ASU patients	Principal referral hospital with large emergency surgery load and high case complexity	• Prince of Wales Hospital • Nepean Hospital • Westmead Hospital • John Hunter Hospital
Mixed emergency & elective sessions	• Sessions are planned to accommodate expected emergency cases and any variation in emergency surgery load could be covered by short notice elective cases	Low emergency surgery load and low complexity of cases	
Designated Emergency & Elective Sessions (Auburn Hospital Model)	• Full day sessions are divided into a set amount of time for elective and emergency surgery • Elective sessions run from 0800-1430 with emergency surgery commencing at 1430-1830	Hospitals where emergency surgery load and case complexity are relatively low	• Auburn Hospital
Designated daily full emergency surgery sessions for single specialties	• Daily emergency session available for single specialty e.g. orthopaedics & general surgery • Availability of appropriate surgeon to ensure full utilisation	When emergency surgery load is sufficient	• Liverpool Hospital • Lismore Base Hospital
Designated full emergency sessions less frequent than daily	• Sessions available for a number of lower volume emergency surgery specialties	Lower volume emergency surgery specialities e.g. plastics, ENT, Urology	
Designated daily emergency surgery sessions	• High volume of orthopaedic emergency caseload allocated a designated daily session within standard hours. Orthopaedic consultant surgeon allocated to supervise the session • A general emergency session staffed 24/7 for all other specialities	Principle referral hospital with large emergency surgery load and high case complexity	• St George Hospital
Late afternoon session “Twilight session”	• Facilitates patient preparation during the day • Usually conducive for surgeon available • Difficult to coordinate multiple consultants	Low volume emergency surgery load	

In some hospitals, the emergency surgery load can be managed by providing a few additional sessions in standard hours (Sing et al 2005) However, in many hospitals, the available sessions in standard hours are few in number and the hospitals have limited or no capacity to create the additional sessions due to the volume of elective surgery. In these circumstances, some surgery may require to be allocated to another hospital within their hospital network.

A change in the designation of hospitals can provide opportunities for nurses. In hospitals that have a significant load of emergency surgery, nurses will

be able to specialise in emergency surgery nursing. Indeed, if an emergency surgery model, such as an Acute Surgical Unit, is supported then opportunities will be available for specialist nurse roles specific to emergency surgery, especially for orthopaedics and general surgery.

The down side of adding the emergency load to daylight operating theatre sessions is that emergency surgery is still incorrectly perceived as unpredictable and unplanned. However, the redesign of emergency surgery makes it more closely resemble the planned arrangements of elective surgery. Emergency cases are allocated theatre times, during daylight hours with an assigned surgeon. The resultant patient and staff education can be provided at an appropriate time in an environment conducive to learning.

The streaming of elective from emergency surgery in hospitals is increasingly being implemented in Australia and in many other countries. Commissioner Garling, in his review of acute care services in NSW recommended separation or streaming of elective and emergency surgery (New South Wales Department of Health 2008). In NSW, examples already exist in general surgery, orthopaedic surgery, obstetrics, trauma surgery and hand surgery. More widespread application of the principles must be achieved to provide emergency surgery in the most efficient and safe manner and to the highest levels of satisfaction for patients and clinicians.

Not all hospitals have the full complement of services required by every patient presenting in need of emergency surgery. It is appropriate, where possible, that patients receive their treatment close to their home. Nevertheless, some patients will be required to travel or be transported to more distant hospitals in order to receive the specialised emergency surgical care they require.

Matching the resources

The designation of hospitals for either high volume emergency or elective surgery consolidates the expertise required to deliver timely and quality care. Where necessary, equipment, information technology and other resources will need to be relocated to meet the needs of the reconfigured emergency surgery service. Of particular importance is the responsiveness of diagnostic services for emergency surgery. Radiology and pathology services have to facilitate and prioritise the necessary emergency surgery patient investigations in a timely manner and support the theatre scheduling of these patients in standard hours.

Matching of resources to the needs of the hospitals that are designated to provide high volume emergency surgery is crucial. This ensures Intensive Care Units, diagnostic services and the associated levels of staff will also be present. This concentration of staff and resources will benefit nurses working in the emergency department, the operating theatres and the surgical wards. A system of ward and theatre rotation for nurses could also be established to expose and educate nurses who are interested in emergency surgery as a specialty and to support their upskilling and development.

Potential benefits exist in bed aggregation and designation of beds for emergency surgery. A unit specific to emergency surgery admissions works to support the wards and operating theatres, improve hospital processes and provide high quality of care. The primary focus is on rapid assessment, faster diagnosis and earlier treatment for surgical patients.

The support of appropriate levels of allied health staff is also an essential success factor in emergency surgery redesign. These patients are acutely unwell by the very nature of their clinical presentation and many will require a higher level of allied health management than equivalent patients undergoing elective surgery.

Surgeon-led models of emergency surgery

The surgeon-led model requires a surgeon to take responsibility for managing all emergency surgery patients and being ‘on site’ during a designated period of time. As the surgeon has no additional commitments and is ‘on site’, the specialist management of patients is immediately available. Consultant surgeon operations are more time efficient than those of trainees and their clinical decisions more certain.

In many hospitals, identifying the appropriate surgical specialty or the surgeon responsible for newly admitted emergency surgery patients can be problematic. Roster swaps, clarity of admitting specialty, pre-admission investigations and the absence of protocols for emergency surgery patients are some of the problems currently faced by nurses. With the adoption of a surgeon-led model of care, much of this uncertainty can be eliminated.

Consultant surgeon-led models of emergency surgery care already exist in some hospitals in Australia and there are a number of examples in NSW. The specifics of the models selected will be determined in part by the emergency surgery volume, the surgical specialty requirements, the role of the designated hospital and surgical staff availability in the hospital.

A hospital with sufficient emergency surgical load in general surgery or orthopaedic surgery can establish an Acute Surgical Unit (ASU) (Parasyn et al 2009) in one or both of these specialties. The ASU model is consultant-led with surgeons limiting or relinquishing all competing commitments (e.g. consulting in private rooms, private sector operating) during period's on-call. The on-call frequency for the consultants will be influenced by the emergency surgery caseload. The ASU surgeon works with a team of registrars and specialised nurses to assess and manage pre-operative and post-operative surgical patients. This streamlines surgical assessment and decision making by surgeons, improves theatre scheduling, increases theatre utilisation and ultimately improves the patient outcomes.

ASUs have already been established in a number of hospitals in NSW. Some examples exist outside NSW and are generally in hospitals with high emergency load specialties e.g. orthopaedics, plastics, general surgery and paediatrics. Many advantages of ASUs exist for patients, staff and hospital function. Timely patient assessment, improved communication between surgical teams and other treating and referring specialties and increased consultant input into patient management are some of the advantages. Emergency departments will also experience certainty in contacting the emergency surgery team as they will have a more defined focus on assessing and directing emergency surgery care.

There is increasing use of event driven protocols for a range of emergency surgical conditions. Protocols provide a comprehensive care path for medical, nursing and allied health. They express the agreed clinical decisions of the involved specialists and they encourage continuity of patient management by registrars, junior medical officers and case managers when individual consultants are handing over care. Protocols provide an effective and efficient system for monitoring and recording variances for the purpose of reviewing and improving patient care and their further adoption should be encouraged.

Effectively, a surgeon-led model, will improve communication between clinicians, increase the level of supervision for trainee registrars and improve outcomes for patients.

CONCLUSION

The benefits of the redesign of emergency surgery will be observed clinically, in the workforce and in resource management. The benefits will be realised by commitment and active partnership between managers, surgeons, nurses and other surgical staff. Clinical benefits anticipated include improved patient outcomes, enhanced patient and surgical team satisfaction and increased trainee supervision in emergency surgery. Significant management benefits will ensue from high rates of emergency operating theatre utilisation reduced patient cancellations and reduction in after-hours costs.

The specific advantages for nurses in redesigning emergency surgery in any hospital, whether working in the emergency department, surgical wards and the operating theatres, are undeniable. Improved access to consultant surgeons for patients, nurses and junior doctors, the alignment of surgeons to emergency surgery theatre time and a co-ordinated approach to the delivery of emergency surgery in a hospital or across a network of hospitals are all achievable.

The inclusion of nurses in an ASU provides nurses with a determined career path in emergency surgery, in an established team with a dedicated purpose. Similarly, even without establishing a full ASU, opportunities exist for nurses to work closely with

consultant surgeons in an environment tailored to the actual workload rather than working in an under resourced service.

The opportunities for nurses to take part in redesign are numerous and this should be promoted as a way of working with surgeons, having the common goal and clear direction to deliver patients an improved, timely and high quality emergency surgery service.

The greatest benefits of emergency surgery redesign will be to operating theatre nurses in terms of theatre access in daylight hours, a reduction in call backs, overtime and over runs of theatres and a planned approach to emergency theatre allocation. Emergency department nurses and ward nurses will also benefit from a defined career path in emergency surgery, a coordinated approach to a previously unplanned workload and opportunities for career advancement in a previously professionally unstructured specialty. Emergency surgery for nurses does mean measure the load, change the service delivery configuration and reap the benefits.

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