Sothinathan ANAESTHESIA

SSC 5C Elective: The Provision of Anaesthetic Services at Colchester Hospital University NHS Foundation Trust

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Elective Dates	:	06.05.2013 – 07.06.2013
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Objectives

1. Compare and contrast anaesthetic practice in different surgical and patient groups including pre and postoperative management (relating to comorbidities) in the UK population presenting to a typical district general hospital like Colchester.

2. Undertake audit within the Intensive Care Department to help improve patient outcomes.

3. Develop an understanding of the immediate, short and long term complications of anaesthesia and how these complications are managed, including exposure to how patients are managed on the intensive care unit following major surgery and/or complications.

4. Develop competencies and transferable skills during the elective period to include those outlined in the year 5 student logbook and also gain exposure to pre-operative assessment of patients who will undergo anaesthesia. In relation, plan to keep a log of interesting cases to reflect and learn from. Also aim to gain experience in practical procedures.

I undertook my elective period at Colchester General Hospital gaining wide exposure to anaesthetic practice both in theatres but also in ward settings as well as some time spent on the intensive care unit.

Anaesthetics is a large department at the hospital, possibly the biggest and they play an important role in the care of patients who are critically ill (ITU/HDU), require airway support (crash calls / A&E) and those requiring surgery. In the latter, they play a major part in the running of hospital operative services by coordinating a multidisciplinary team involving surgeons, operating department practitioners, nurses, porters, recovery staff, medical teams and of course the anaesthetic team themselves. It quickly became apparent to me that being an anaesthetist requires a thorough grasp of anatomy, medicine, surgery and

crucially physiology and the physics of gases to name a few domains. Training in anaesthesia, and ITU, from my observation appears to be well supported and hands on as well as theoretical.

During my time at the hospital, I was able to gain skills in venepuncture, IV cannulation, blood gas analysis, airway management and spent some time shadowing ITU medical staff, helping to examine patients and execute treatment plans. I was able to observe the placement of venous and arterial catheters and appreciate the importance of infection control and ultrasound scanning in providing patients with gold standard care.

I am going to include two areas of my elective in this report that were quite interesting.

Firstly, I was given the opportunity, together with an ITU SHO to design and undertake an audit looking at the rates of readmission to the ITU at Colchester following stepdown previously. This was seen as very important by the department as originally there was little analysis of such data and we were able to see, following a literature review, whether we could identify potential predictors of possible readmission such as vital observations, time of stepdown and reason for admission. We were also able to identify shortcomings such as inappropriate or inadequate handover so that these areas could be improved upon. The plan is to present the findings from this audit at the local meeting later this summer and then prepare a poster for presenation at a national conference this winter.

Secondly, I came across an interesting anaesthetic complication, post operative delirium, during my placement and have decided to look into the literature available as I had previously not been aware of such a complication.

Anaesthesia and complications

- Postoperative delirium following surgery
- I have used orthopaedic trauma surgery as an example of a scenario that may affect many elderly patients undergoing general anaesthesia.

The definition of an elderly person is not clear, however most developed counties accept that an individual of 65 years of age and older is 'elderly' (WHO 2012). By 2035 the population of over 65's in England is expected to reach approximately 14million people, accounting for 22.8% of the population (Office for National Statistics n.d.).

Currently around 75,000 people in the UK suffer a proximal femoral fracture (hip fracture) per year in the UK with a mean age of 84 years in men and 83 years in women 10-20% of those admitted ultimately move to institutional care. Mortality is general is high with a 10% mortality rate at 1 month, and a further one third of patients dying within 12months (NICE 2011). These fractures frequently occur in frail patients with multiple co-morbidities taking a high number of regular medications (Furlaneto & Garcez-Leme 2006). Increased longevity broadens the range of physiologic manifestations a patient may

present with. An increased variability in the signs, symptoms, and physical characteristics an elderly patient will show is typical, necessitating a thorough preoperative assessment (Cullen et al. 2005).

The increased medical complexity of an elderly patient translates to an increased perioperative mortality rate in a given elderly population. Overall mortality within 30 days of surgery in the general population is around 1.2%, compared to 2.2% in those aged 60-69years and 2.9% in those aged 70-79years (Jin & Chung 2001).

A common postoperative complication of surgery in an elderly patient is delirium. Postoperative Delirium (POD) is characterised by incoherent thought and speech, disorientation, impaired memory, and attention (Jin & Chung 2001). Auditory and visual hallucinations are another feature which can be vivid and very frightening(Parikh & Chung 1995). In orthopaedic patients the incidence of perioperative delirium ranges from 28%-41%. Persistent postoperative delirium is independently associated with poor functional recovery at 1 month after and delirium that resolves within 6 weeks of onset leaves a patient less likely to return living with a relative at 3 months. In the short term delirium is associated with more in-hospital medical complications and length of hospital stay, and mortality (Khwaja Zakriya et al. 2004).

Bedside tests used to diagnose POD include the Mini Mental State Exam (MMSE) (Folstein et al. 1975) and the Confusion Assessment Method (Inouye et al. 1990). Early diagnosis is essential and organic underlying causes of delirium such as pneumonia, sepsis, or myocardial infarct must be excluded (Parikh & Chung 1995).

The ability to predict and prevent POD would clearly be advantageous. Table 1 from (Parikh & Chung 1995) provides a framework of patient care to help reduce POD. This includes a thorough preoperative assessment and actions to take in the intra and postoperative periods. (see table overleaf)

Table 1

Preoperative assessment
Detailed history of drugs
Medical problem evaluation
Detection of sensory or perceptual deficits
Detection of cognitive impairment by neuropsychologic testing*
Mental preparation (orientation and communication) before to surgery†
Use of geriatric-anesthesiologic programme‡
Intraoperative precautions
Adequate oxygenation and perfusion
Correct the electrolyte imbalance
Adjust drug dose
Minimize the variety of drugs
Avoid atropine, flurazepam, scopolamine
Postoperative care
Environmental support
Well-lit cheerful room
Quiet surroundings
Keep patient oriented
Visit by friend or family
Pain control
Postoperative intervention (hearing aid, vision aid, non-pharmacological sleep aid, early mobilization, correction of dehydration)†
Identify risk-associated drugs
Anticholinergics
Depressants
H_2-antagonists
Reassure patient and family

Other specific preoperative predictors of POD of patients undergoing hip surgery are an abnormal serum sodium, an ASA status >II, and a normal white cell count, thought to reflect an inability to mount stress response(KJ Zakriya et al. 2002). Associations with intraoperative blood loss, postoperative blood transfusions and a postoperative haematocrit of less than 30% suggest hypoxemia may contribute to POD. Large studies, however, have failed to demonstrate either hypoxemia or hypotension contribute to POD (Moller et al. 1998).

Sanders (S et al. 2011) described delirium as a type of cognitive disintegration, caused by a disruption to the integrated neural function of the brain. He proposed sedative drugs act to further decrease network integration in the brain through altering the balance of neural transmission predominantly through increases in inhibitory tone mediated by γ-amino-butyric acid (GABA) signalling in the brain. Typically used anaesthetics such as sevoflurane and propofol which potentiate GABA mediated signalling may induce postoperative delirium (S et al. 2011).

Use of anaesthetics not functioning on the GABA receptor, such as Xenon, have been trialled to reduce the incidence of POD. Xenon is thought to induce anaesthesia by acting on the *N*-methyl-D-aspartate or two-pore-domain-potassium channels as opposed to the GABA receptor. Additional benefits of the use of Xenon as an anaesthetic agents are its ability to protect the brain, heart and kidney from toxic insults including ischemia (Sanders 2003).

A randomized multi-centre trial is due to complete in 2013 which compares the use of Xenon as an anaesthetic agent to reduce incidence of POD compared to sevoflurane within 4 days of surgery and reduce organ dysfunction and therefore healthcare cost associated with POD in patients with hip fractures (Coburn et al. 2012). One issue however with Xenon is the cost differential compared to traditional anaesthetics; in 2003 a 240minute Xenon anaesthetic was estimated to cost US $167.00 compared to US $30.00 and US $74.00 for nitrous oxide and isoflurane respectively (Goto et al. 2003).

Other theories regarding the pathogenesis of POD include a reduction in levels of acetylcholine and increases in serum cortisol from the surgical and anaesthetic stress (Parikh & Chung 1995).

It has been suggested that the bispectral index (BIS) may be of value in reducing POD. BIS is a continuous electroencephalogram that can measure the hypnotic effect of anaesthetic and sedative drugs on the brain. Titrating isoflurane using BIS monitoring can allow an anaesthetic to be maintained with a 30% lower dose of isoflurane. This has been shown to expedite emergence from and recovery from anaesthetics in elderly patients having elective hip or knee replacements (Wong et al. 2002). However, this study did not demonstrate BIS monitoring changed any clinical outcome in terms of cognitive function.

From my exposure to a patient who suffered from POD, I have learnt that this common problem can have a profound impact upon a patient's clinical and socioeconomic recovery. A review of the literature on POD demonstrates that the highest standards of perioperative clinical care and a well conducted anaesthetic with good intraoperative monitoring can help prevent its development. Prompt postoperative recognition of POD and treatment with the drug of choice Haloperidol (0.25-2mg) is also essential (Parikh & Chung 1995). On-going clinical trials such as the use of Xenon anaesthetic may in the future help further prevent POD.

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