



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 1st September 2016. 22nd September Publication date
September 2016.

Attendance: Paul Healey, Kylie King, Tod Eggleton, Patrick Farrell, Michael Dobbie, Keith Streatfeild, Luke McConnell

TOPIC 1:

A middle aged male was sent from Armidale. Following a trauma, he had his #ankle plated, complicated by a DVT and a small PE. He was then anticoagulated, and this was complicated by a cardiac tamponade. The chest was opened and packed, and the patient transferred to JHH ICU. The anaesthetist was then faced with the decision to a) move the patient to theatre with a pH of 6.9, Lactate 17 and cold (34-35deg) – OR- b) encourage the ICU to continue his supportive management until his physiology showed some recovery.

Perils of anticoagulation from Dr Paul Healey:-

A 40 year old male was retrieved from a peripheral hospital for thoracotomy and drainage of haemothorax.

He was a healthy man who approximately 6 weeks prior had fractured his ankle playing soccer. He had unfortunately developed a DVT secondary to immobilisation, and was warfarinised. Prior to this he was taking no medications. His DVT progressed to a PE.

He had presented to the peripheral hospital with ongoing chest pain. His warfarin was subtherapeutic, and he was commenced on therapeutic clexane. Unfortunately over 12 hours he developed worsening chest pain, shortness of breath and hypotension. A CXR revealed a large right sided haemothorax with midline shift. He was referred to the retrieval team for transfer to JHH.

He became progressively more unstable and a decision was made to reverse his anticoagulation and perform an emergency thoracotomy to pack his chest at the peripheral hospital. Unfortunately he suffered 2 cardiac arrests during this time. He was able to be resuscitated with short periods of CPR, adrenaline and fluid resuscitation. The surgery was successfully performed with an ICC left in-situ. He utilised all the available blood products at the peripheral hospital (FFP, 30mL/kg of prothrombinex), and was transferred to JHH.

He was met on arrival in ICU by the anaesthetic and surgical team. Theatre was prepared for possible surgery. On arrival his haemodynamics were stable with HR 110bpm and SBP of 100mHg on 20mL/hr of standard dose adrenaline. He had a SaO₂ of 95% on 100% oxygen and there was minimal drainage in the ICC. His temperature was 34 degrees and an ABG showed a pH of 6.9 with mixed respiratory and metabolic acidosis. His lactate was 17 mmol/L.

A discussion with the ICU team, the surgical team and anaesthetics determined that the patient should not proceed to surgery. There was no indication of ongoing bleeding, he was able to be ventilated and the CXR demonstrated resolved midline shift. He was re-warmed, commenced on haemodialysis and continued to have his coagulopathy corrected. He proceeded to OT 2 days later to have his chest explored and closed. He remains an inpatient at JHH with ongoing renal failure.

TOPIC 2:

An 83y male was assessed for PPM box change by a cardiac surgeon. His frailty was exacerbated by a recent stroke, which resulted in a facial weakness with drooling. The RFA (Request for Admission) listed the patient for GA. There is a default expectation by surgeons that patients will be asleep for operations by them. This was felt not to be a sufficient reason to add to the risks faced by this patient, who could easily be managed with a local anaesthetic, a procedure done under LA in large volumes by cardiologists.

TOPIC 3:

A 60y male was assessed for bilateral TKR. His BMI was 55, and he exhibited all the usual accompaniments of this, namely, poor mobility, OSA/CPAP, HTN, DM, etc. The Provisional Fellow who saw him in the clinic was unimpressed by the suitability of this patient for bilateral TKR, and the surgeon was approached to determine his thinking. It was discovered that the patient was the one pushing for both knees to be done at the same operation, the surgeon escaping any confrontation by referring the patient to the anaesthetist "gatekeepers". A quick survey of the surgeons provided some consensus for the following criteria for bilateral TKR. 1. Fit young(er) patient 2. Need (self-employed, essential to minimise time off other duties) 3. Understanding the essential requirements for participation in rehab.

A more reasonable expectation was put to the patient, who acquiesced without complaint.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 4th August 2016.
Publication date 11th August 2016.

Attendance: Paul Healey, Michael Hicks, Patrick Farrell, Kylie King, Pragua Ajitsaria, Rhys Thomas, Peter Harrigan, Len Conrad, Monica Diczbalis

TOPIC 1:

64 year old male presented to clinic for review for colonoscopy as part of 5 yearly screening for colorectal cancer. He has a positive family history of CRC and has altered bowel habit.

He had a past history of Obesity (BMI 39), COPD, poorly controlled Type II Diabetes Mellitus (HbA1c = 9.0 mmol/l), and iron deficiency anaemia. He had a mild intellectual disability, however lived alone and was independent with all activities.

During the six months that he had been waiting for his colonoscopy he had progressively worsening SOB/OE. He had been seen by a cardiologist and had an angiogram that had demonstrated minor coronary disease and an echocardiogram that showed normal LV size and function with moderate to severe aortic stenosis (mean gradient = 33mmHg) and raised LVEDP (20mmHg). The cardiologist had referred him to a cardiac surgeon and he was currently waiting AVR. Due to his iron deficiency anaemia the cardiac surgeons had requested he undergo gastroscopy and colonoscopy prior to his AVR. No dates had been set for gastroscopy.

His spirometry showed an FEV1/FVC of 1.4/3.0L, with an FEV1 of 40% predicted and significant small airways disease – MEF25-75% recording 16% of predicted value. His pathology demonstrated iron deficiency and reduced GFR of 34 mL/min.

Discussion

- Should we organize for this patient to have gastroscopy at the same time as his colonoscopy? He will then only require one anaesthetic prior to his cardiac surgery.
- Can we optimize his medical co-morbidities prior to this surgery?
- What are the potential sources of his iron deficiency?

Outcome

- The patient had seen a private gastroenterologist about his iron deficiency in the past month. They had recommended gastroscopy +/- small bowel capsule. Given this recommendation his situation was discussed with the booking surgeon and gastroscopy was added to the consent for the current procedure.
- He had recently seen the Diabetes physician about his glycaemic control. His insulin had been changed and he was to be reviewed in 3-6 months. His HbA1c should aim to be < 7.5 mmol/L prior to elective surgery. Given his ongoing poor control, he will be referred back to his specialist prior to his cardiac surgery. At this stage his endoscopy procedure should go ahead. He may require an insulin infusion if his glycaemic control is poor perioperatively.
- His COPD is currently managed with regular puffers and he has been compliant with his therapy.
- His iron deficiency may be related to reduced intake or increased loss. The presence of aortic stenosis may lead to small bowel AVMs (Heydes syndrome). This can be reversed by AVR. He is currently on oral iron supplements, and his haemoglobin is normal.

TOPIC 2:

68 year old female presented to the perioperative clinic for left frontal craniotomy for resection of renal cell carcinoma metastasis.

Her background history includes:

- Metastatic renal cell carcinoma – she has left renal mass, bilateral lung masses and a single cerebral metastasis. She has not had any complications from her renal or lung disease.
- Cushing's syndrome secondary to high dose steroid treatment for her cancer.
- Postural hypotension – treatment with fludrocortisone
- Essential tremor – no treatment

She has recently had increased neurological symptoms related to her brain metastasis and significant side effects of dexamethasone treatment. She has developed word finding difficulties and right sided upper limb and lower limb weakness. This was improved somewhat with steroid treatment, however she has had significant problems with weight gain, fluid retention and difficulties sleeping. She was offered surgery to resect the tumor, and allow cessation of dexamethasone. There were clear goals of treatment – to relieve symptoms and improve quality of life, not to cure the cancer.

Her medications include: sunitinib, fludrocortisone, esomeprazole, fentanyl patch (12.5mcg/hr), dexamethasone (4mg daily), oxazepam, oxybutynin, amphotericin.

Discussion

- Is this an appropriate indication for surgery?
- What are the perioperative implications of sunitinib?

Outcome

- There was discussion about the appropriateness of surgery. A discussion was had with the patient about risks of surgery, including death, cardiorespiratory failure, increased neurological impairment and dependency. She was encouraged to have discussions with her husband (who was present at the interview) about end-of-life and appropriate interventions. It was agreed the surgery should go ahead.
- The perioperative implications of Sunitinib were discussed. It is an oral receptor tyrosine kinase inhibitor primarily used in metastatic renal cell carcinoma, GIST tumours, and pancreatic neuroendocrine tumours. It may be used in research settings for other tumours. It works by blocking the tyrosine kinase activities of vascular endothelial growth factor receptor (VEGFR), platelet derived growth factor receptor (PDGFR) and c-kit, thereby inhibiting angiogenesis and cell proliferation.
- The incidence of side effects with sunitinib is low, and there is minimal effect on risk of infection and wound healing. When discussed with the treating oncologist, their advice was that this medication does not need to be interrupted perioperatively.
- There is minimal risk of interaction between sunitinib and anaesthetic drugs.
- It was therefore concluded to continue the sunitinib perioperatively.

TOPIC 3:

A recent correspondence from Anaesthetists in Coffs Harbour and Dr Kerridge was discussed. The group of anaesthetists in Coffs Harbour were seeking guidance on how to manage NOACs in the perioperative period for elective surgery.

In particular the group of anaesthetists were seeking to formulate a standardized approach to the management of the NOACs. It was noted that there is no standardized approach currently at JHH. We have a table of recommendations that was produced in the past two years and lives on the regional trolleys in some operating theatres at JHH.

Ideally a standardized approach should be developed. Agreed guidelines should incorporate the current standards in international guidelines such as the ASRA guidelines on Regional Anesthesia in the Patient Receiving Antithrombotic or Thrombolytic Therapy. The last update of this guideline was in 2010, and there is an update due out imminently. These guidelines are generally conservative in nature and should therefore

satisfy all of those anaesthetists who work within this system. There has recently been a publication by ASRA on interventional spine and pain procedures in patients on antiplatelets and anticoagulants. They recommended 4-5 days cessation for dabigatran, 3 days for rivaroxaban and apixaban. In patients with renal failure a longer time may need to be considered. (see table below – extract)

It was agreed that we should develop a reasonably pragmatic guideline for use in our clinic for elective surgery. This should be completed by the end of the year. In the interim the following application from ASRA was discussed as being useful to guide recommendations for NOACs in elective surgery (\$5.99 from itunes).

<https://itunes.apple.com/au/app/asra-coags/id858796572?mt=8>

SPECIAL ARTICLE

**Interventional Spine and Pain Procedures in Patients on
Antiplatelet and Anticoagulant Medications**
*Guidelines From the American Society of Regional Anesthesia and Pain
Medicine, the European Society of Regional Anaesthesia and Pain Therapy,
the American Academy of Pain Medicine, the International
Neuromodulation Society, the North American Neuromodulation
Society, and the World Institute of Pain*

Samer Narouze, MD, PhD, Honorio T. Benzon, MD,† David A. Provenzano, MD,‡ Asokumar Buvanendran, MD,§
José De Andres, MD, PhD,|| Timothy R. Deer, MD,# Richard Rauck, MD,** and Marc A. Huntoon, MD††*

TABLE 4. Recommended Intervals Between Discontinuation of the New Anticoagulants and Interventional Pain Procedure and Between the Procedure and Resumption of the New Anticoagulants

Drug	Half-life	Recommended Interval Between Discontinuation of Drug and Interventional Pain Procedure* (5 Half-lives)†‡	Recommended Interval Between Procedure and Resumption of Drug
Dabigatran	12–17 h 28 h (renal disease)	4–5 d 6 d (renal disease)	24 h
Rivaroxaban	9–13 h	3 d	24 h
Apixaban	15.2 ± 8.5 h	3–5 d‡	24 h

*The procedures include medium- and high-risk interventional pain procedures. For low-risk procedures, a shared decision making should be followed, a 2 half-life interval may be considered.

†Because of the lack of published studies and in view of the added risks involved in patients with spine abnormalities, we took the upper limit of the half-life of each drug in calculating the 5 half-lives.

‡The potency and the wide variability in the pharmacokinetics of these drugs make us recommend a longer interval.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 7th July 2016.
Publication date 14th July 2016.

Attendance: Pat Farrell, Rob Thomas, Paul Healey, Pedro Diaz, Pragya Ajitsaria

TOPIC 1: *Oesophagectomy for adenocarcinoma of the distal oesophagus.*

78 year old male reviewed in the perioperative clinic for Oesophagectomy for adenocarcinoma of the distal oesophagus.

Background

1. Hypertension
 - controlled on medication
2. Hypercholesterolaemia
3. Type 2 diabetes
 - Diagnosed 3 years ago.
 - Denies peripheral neuropathy. Likely nephropathy – eGFR 60mL/min
 - Last HbA1c 7.9%

Medications : pantoprazole, rosuvastatin, glicazide, fosinopril/ hydrochlorthiazide, metformin, paracetamol.

He is ex-smoker (1968) and does not drink alcohol. He has good exercise tolerance – he mows his lawn, plays golf 3 times per week walking the course. He was able to climb 4 sets of stairs when reviewed by the surgeons.

His vital signs were normal, and he had a normal cardiorespiratory exam. His ECG demonstrated a right bundle branch block with left axis deviation, and possible voltage criteria for LVH. His spirometry showed FEV1/FVC of 2.2/3.5L. His FEV1 was 72% of predicted.

He will not be having neoadjuvant chemotherapy or radiotherapy.

Discussion

- This is a high risk surgical procedure for cardiorespiratory morbidity and mortality.
- He has minimal co-morbidities, however he is advanced in age for this procedure.
- He has an abnormal ECG which has been shown in some observational studies to increase risk of perioperative morbidity.
- His diabetic management is sub-optimal for major surgery.
- There was some debate about any further investigations – echocardiogram, stress testing, CPET.

Outcome

- This patient was discussed with the Diabetes advanced trainee at JHH. He had an outpatient appointment with the diabetes service to optimize his perioperative diabetes control.
- Given his abnormal ECG he was referred for outpatient echocardiogram – this was normal.
- The patient had an outpatient CPET test. This provides a stress test with ECG monitoring to examine for myocardial ischaemia and examines his cardiorespiratory reserve. His results showed an anaerobic threshold of 10.1mL/kg/min, and a VO2 peak of 18.1mL/kg/min. This puts him at intermediate risk of perioperative complications based on prior research.
(See attached notes from Dr Ajitsaria on CPET testing from Perioperative Conference and results from patients CPET test).

EXERCISE TEST REPORT



Pulmonary Function Laboratory
 Department of Respiratory & Sleep Medicine
 John Hunter Hospital
 Lookout Road, New Lambton Heights, NSW 2305
 ph: 02 4921 3462 fax: 02 4921 3469

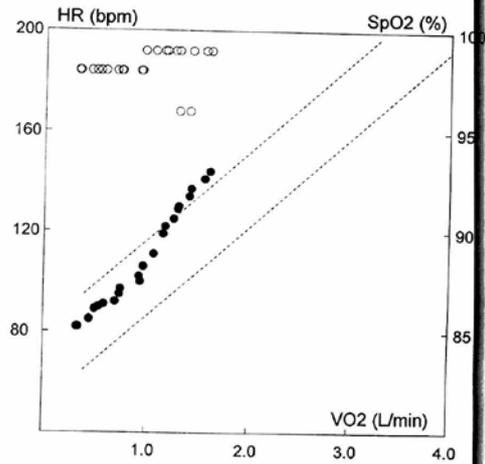
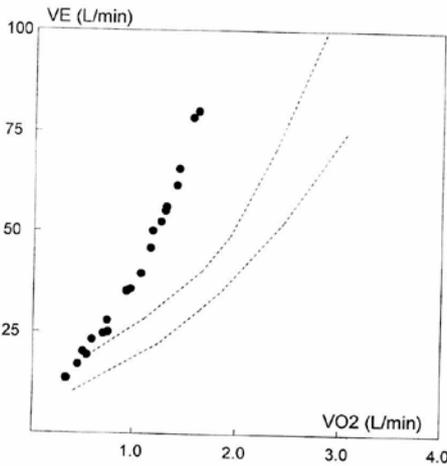


To: Dr R Kerridge, Anaesthetics
 Cc: Test Date: 06/07/2016
Test Time: 09:00

Height (cm):	170	Smoking Hx:	Stopped 1968
Weight (kg):	89	Pack years:	8
BMI (kg/m/m):	30.8	Last BD:	Nil

Clinical Note: Pre-op: esophagectomy

	Predicted	Measured	(% pred.)	Borg Symptoms
VE _{max} L/min	94	80	(85%)	Dyspnoea 3
HR _{max} bpm	146	144	(99%)	Leg fatigue 5
W _{max} W	118	100	(85%)	Chest pain 0
VO ₂ peak L/min	2.20	1.61	(73%)	
VO ₂ peak ml/min/kg		18.1		
Time min		10 (inc = 10 W)		Rest BP 140/80 Peak BP 190/120



Technical Comment: No relevant medications. Right BBB on resting ECG however no ischemic changes during exercise. (JB)

REPORT

A maximum effort cardiopulmonary exercise test was conducted with leg fatigue being the predominant limiting symptom. The maximum workload achieved was reduced at 85% of predicted. The VO₂ max was reduced at 73% of predicted and the anaerobic threshold was 10.1 ml/min/kg (V-slope method). The ventilatory response was excessive throughout and there was minimal ventilatory reserve at the end of exercise. The heart rate response was within the normal range however was slightly elevated end exercise and maximum predicted heart rate was 99% of predicted. The oxygen pulse failed to rise after 74% suggesting possible limitation to stroke volume. There is a right bundle branch block noted on resting ECG. However during exercise there was no significant oxygen desaturation and no ischaemic changes evident on the ECG.

J D Brannan PhD, Scientific Director 06/07/2016

HNEMR88

Respiratory and Sleep Medicine Report

EXERCISE TEST REPORT (page 2 of 3)

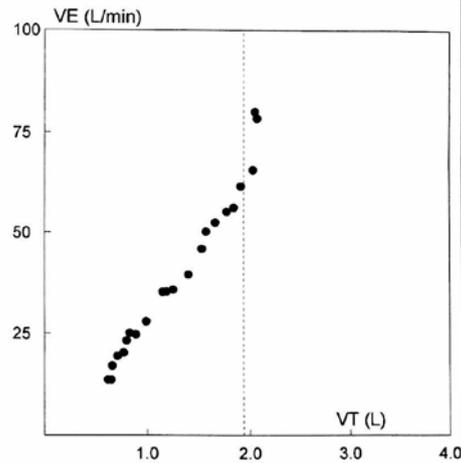
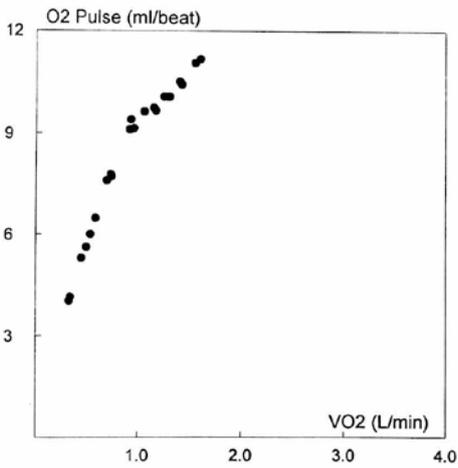
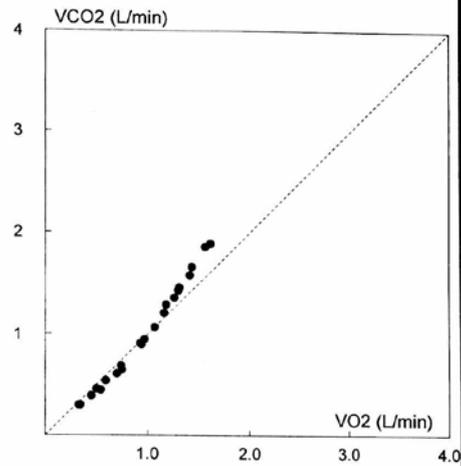
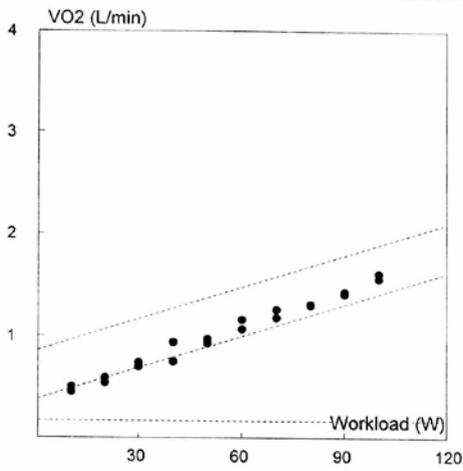


Pulmonary Function Laboratory
Department of Respiratory & Sleep Medicine
John Hunter Hospital
Lookout Road, New Lambton Heights, NSW 2305
ph: 02 4921 3462 fax: 02 4921 3469



To:	Dr R Kerridge, Anaesthetics	Test Date:	06/07/2016
Cc:		Test Time:	09:00
Height (cm):	170	Smoking Hx:	Stopped 1968
Weight (kg):	89	Pack years:	8
BMI (kg/m/m):	30.8	Last BD:	Nil
Clinical Note: Pre-op: esophagectomy			

Other Exercise Graphs



Respiratory and Sleep Medicine Report

HNEMR88

What is it's role?

1. Risk stratification – an AT of 11 or less can suggest increased mortality and morbidity but this magic number will vary with surgery type and improving surgical techniques.
2. Diagnosis and management of comorbidities – for example differentiating breathlessness of unknown cause.
3. Optimisation.

Who should we test?

- Still a work in progress but current systematic review suggests CPET can be used as a predictor of mortality and morbidity in hepatic, pancreatic, colorectal and AAA surgery.
([Br J Anaesth](#). 2016 Feb;116(2):177-91).

What's the Evidence?

- There's a large body of evidence that suggests that functional capacity is related to outcome but the question remains, how should we objectively measure functional capacity? Certainly there has been shown to be no correlation between patient reported METs and actual patient METs – it might be that we need to use a mixture of things -
- The METs Study (all data in so watch this space) looks at this and will attempt to create a model for assessing pre-operative risk.

Practicalities

- Usually on a Wednesday (with some flexibility) at JHH through John Brannan (exercise physiologist) directly either by e-mail (john.brannan@health.nsw.gov.au) or through switch board.
- Patient needs to be able to ride on an exercise bike in order to complete the test.

What does it measure and how?

Patient sits on bicycle ergometer and the resistance they cycle against (or work done) is gradually increased until the patient is no longer able to continue.

Things measured are:

Work done – directly from the bicycle ergometer

VO_2 (O_2 consumption) – calculated by gas analysis and V_E through Fick's Law ($VO_2 = V_E * (FiO_2 - FeO_2)$)

VCO_2 (CO_2 production) – ($VCO_2 = V_E * (FeCO_2 - FiCO_2)$)

V_E (Minute Ventilation) – measured from pneumotachometer.

From this, the following are derived:

VO₂ max – An individual's maximal ability to consume oxygen.

Determined by:

- a. the amount of oxygen delivered to cells from the outside air (telling you about ventilator and cardiovascular capacity)
- b. the efficiency with which the cells oxidise fuel to make energy for work (oxidative capacity).

Determined from: the point at which the VO_2 no longer increases with increased exercise intensity.

Anaerobic Threshold – AT, the oxygen consumption above which anaerobic metabolism commences and blood lactate begins to rise.

- Occurs at between 40 – 60% of VO_2 max
- Results in bicarbonate buffering of the lactate
 - -> excess production of CO_2 -> increase in VCO_2 and V_E .

Determined from: the point at which the respiratory quotient (VCO_2/VO_2) increases during increasing exercise intensity.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 8th September 2016. Publication date 15th September 2016.

Attendance: Ross Kerridge, Fiona Merritt, Sarah Armargo, Neelam Brala, Victoria Fraser, Berni Frost, Monique McLeod, Michael Hicks, Alison Clark, Mark Davies

TOPIC 1: *Random Blood Sugar*

A 55year old patient was scheduled for a septoplasty and FESS. She had type diabetes (on metformin) and a number of other ‘mild’ comorbidities, plus some deficiencies in her compliance with chronic medical therapy. She was noted to have a random blood sugar of 15.1 in the clinic. Surgery was postponed and patient was referred back to GP to optimise diabetes control as well as other issues. One week later, random blood sugar at GP attendance was 12.6. Despite this, HbA1C result was 7.0% (53 mmol/mol in the new units).

Discussion: Random blood sugars are extraordinarily unreliable. Additionally, the relevance of ‘acute’ tightness of control has been questioned in the perioperative setting:- patients become physiologically accustomed to chronic higher sugars, and acute lowering may be hazardous in these patients (somewhat analogous to the findings of the NICE-SUGAR trials in intensive care. So what to do with a RBGL as high as this? Discussed with diabetes service (Sam Acharya):- Current guidelines suggest postponing at this level, but in the absence in other reasons to postpone it would have been appropriate to allow the booking to go through pending review of the result of the HbA1C done at the time of clinic visit. Note that HbA1C can now be tested using point of care systems, and this is being used by Diabetes services, but as in all POCT systems there are quality control and cost limitations.

A point of agreement:- A recent HbA1C (within 3 months) should be obtained on all patients with diabetes pre-operatively.

TOPIC 2: *Hyponatremia*

A 65 year old female scheduled for wedge resection of a lesion in the RML +/- RUL of lung. History of previous head & neck cancer treated with radio therapy in 2008 and subsequently by surgery in 2010. She has had a recurrent “chest infection” with constant cough & haemoptysis treated with antibiotics. ‘Incidental finding of serum sodium of 125. This is chronic, (122 or thereabouts for some four months previously). The patient is asymptomatic. What would be the appropriate management?

Discussion: - Hyponatremia of mild to moderate degree is very common in the pre-operative population. Most common causes are drug effects (hidden thiazide, anti-depressants, and anti-psychotics most commonly or psychogenic polydipsia. Not relevant in this case. Investigation could include U/P osmolality. This case suggests SIADH related to malignancy. Discussed with Judy Luu (Endocrinologist). In the patient who is asymptomatic, no particular intervention is suggested other than water restriction. A vasopressin antagonist (tolvaptan) has become available, but would be inappropriate preoperatively. Pragmatically, it is appropriate to go ahead with this patient but avoid water overload perioperatively, which would seem appropriate advice anyway.

TOPIC 3: *NICE Guidelines*

The UK National Institute of Clinical Excellence has recently reviewed its guidelines for pre-operative tests for elective surgery. A short summary has become available which is succinct and has reasonable advice that appears to be applicable to most situations in Australia. (see attached)

It is of some interest that liver function tests are not noted separately. Group and screen indications are also not mentioned separately. They also endorse point of care testing for coagulation status, which remains controversial in some settings.

TOPIC 4:

A Good Story

A 54 year old lady with a complex ovarian mass and dysfunctional uterine bleeding was referred for assessment. She was 230kg with problematic diabetes and other medical issues. She was knocked back for hysterectomy and it was suggested that a Mirena be inserted under local anaesthesia for symptom control. She left the early consult angry with the anaesthetist and volubly expressing these opinions. Nevertheless, after some consideration she 'turned her life around'. 12 months later she was referred back by her gynaecologist having lost 70kilos, diabetes now virtually resolved, exercising with aqua therapy regularly, and with improvement in many of her other medical conditions. She had a large redundant apron (pannus), which presented a challenge for surgical access.

Surgery went ahead with removal of the mass, oophorectomy and apronectomy, with removal of 12 kilograms of fatty apron. The patient is very grateful for the 'wake up call' 12 months ago.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 11th August 2016. Publication date 18th August 2016.

Attendance: Paul Healey, Ross Kerridge, Kim Rachmann, Mark Davies, Emma Rosenfeld, Gavin Sullivan, Pedro Diaz, Swaetha Koneru, Michael Hicks

TOPIC 1: Aortic synopsis and spinals.

71 years old for total hip replacement. Noted to have aortic stenosis with a pressure gradient of 21 mmHg, chronic renal failure (eGFR 12 mls per minute) currently off dialysis but had been dialyzed briefly after an episode of urological obstruction in March 2015, but now stable. He had a hip replacement in June this year with a general anaesthetic (because of aortic stenosis?) and was noted to have “labile hemodynamics”. Should he have a spinal, GA or would either be safe?

Discussion: - There was general agreement that either form of anaesthesia, with or without a nerve block in addition, would be appropriate. Further, more significant degrees of aortic stenosis should not be regarded as a contraindication to a spinal anaesthetic. Whatever technique is used, it needs to be managed appropriately and with due monitoring.

TOPIC 2: Possible Iron deficiency?

The same patient has haemoglobin of 112, a low serum iron and a ferritin of 240. Should he be considered for iron infusion? Who should we test for iron deficiency?

Discussion: The appropriate iron study to refer to is ferritin, not serum iron levels, which are relatively labile and have little relationship to iron stores. In a patient with an inflammatory state, ferritin may be abnormally raised, so that it is possible that the patient is somewhat iron deficient even with a ferritin of 220. CRP assay is used to diagnose inflammatory state. With a ferritin of 220 the patient may have mild degree of iron deficiency, but it is probably an excessive intervention to give an intravenous iron infusion.

It is reasonable to perform iron studies on all patients coming for surgery where significant blood loss may occur, including major joint replacement. Non-anaemic iron deficiency is relatively common in this population. The performance of elite athletes who are non-anaemic but have mild to moderate iron deficiency improves with iron infusion, and it is suggested that therefore we should be more aggressive in treating iron deficiency pre-operatively.

The National Blood Authority website www.blood.gov.au is an excellent resource on this and all things ‘blood’.

TOPIC 3: Investigation of Ischemic Heart Disease

A 73 year old male for a total knee replacement gives a history of Ischemic Heart Disease with a STEMI 3 years ago treated by a Stent (DES to LAD). Noted to have 80% stenosis of RCA at the time, but this was not treated. Has recently been reviewed by cardiologist (April 2016), and at that time thought to be clinically stable. Echo was OK. Exercise tolerance is limited by arthritis in knees. He is currently stable on medical therapy although compliance is suboptimal. Should the patient be further investigated prior to this surgery to clarify ischaemia in the right coronary territory?

Discussion: - If the patient is investigated it is possible that this would then lead to a stent which would lead to postponement of surgery for 6 to 12 months. A chemical stress test (dipyridamole sestamibi) may demonstrate ischemia however it is unlikely to change management. It was suggested that more “aggressive” investigation may be appropriate for major surgery, but not for intermediate surgery such as TKR. Pragmatically, there must be many patients with similar asymptomatic disease passing through our hands frequently. Hence the suggested management was: Check back with the cardiologist who recently saw the patient; Plan for surgery to be performed in a hospital with cardiology back-up; Manage expectantly.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 14th July 2016.
Publication date 25th July 2016.

Attendees: Pragma Ajitsaria, Ross Kerridge, Lucy Anderson, Michael Hicks, Tracey Tay, Paul Healey, Louise Hails, Sharon McGregor, Kim Rackemann, David Cottee

TOPIC 1: *Assessment & Preparation in a Nonagenarian*

- 92 year old female presented to perioperative clinic for WLE of buccal mucosa. Background history:- Generally fit and well; Only medication paracetamol PRN; Recent bowel resection for cancer March 2016, from which she recovered well. Mental state testing – orientated to person, place and time. Unable to name the Prime Minister immediately, (actually only a caretaker at present), but could name his wife Lucy!
- Loud aortic systolic murmur on examination. No previous investigations. ECG normal.

Discussion

- Patient obviously old, however functionally reasonable
- Recent colorectal surgery in the private sector with good result and no complications
- Age should not be a barrier for consideration of surgery – (raised by RK who has vested interest!!)
- Interestingly a quick google search reports a life expectancy of 4.1 years for a 92 year old female (in America).

Outcome

- Patient had been referred for echocardiogram (Some suggested this was unnecessary:- Would results of echo really change perioperative management?) If results of echocardiogram reasonable – OK for surgery

TOPIC 2: *Booking for ICU/HDU postoperatively*

71 year old man presents to clinic referred by surgeons for early consideration of pharyngolaryngectomy and WLE of tonsil. Surgeons had not indicated any need for ICU or HDU on admission request.

Background

- Peripheral vascular disease:- Iliac artery stenting in 2014, Nil ongoing issues
- Osteoporosis:- Multiple fractures including vertebral wedge fractures
- Smoking > 50 pack years. Ceased 6 weeks ago. No formal diagnosis of COPD, nil puffers. FEV1 : 2.2L (70% normal)
- Postural hypotension:- Takes fludrocortisone 100mcg daily

His medications include: clopidogrel (ceased for 2 weeks), amlodipine, rosuvastatin, oxybutin, varenicline (Champix), fludrocortisone. He is able to climb a single flight of stairs and is limited predominantly by hip pain.

Discussion

- Suitable to go ahead for surgery
- Emphasize smoking cessation
- Continue cessation of clopidogrel, but not aspirin.
- This is major surgery with duration greater than 12 hours. Must have ICU bed post operatively. Note that surgeons may submit the RFA with no ICU bed required ticked. Don't be fooled!

TOPIC 3:

Morquio Syndrome

40 year old male booked for right TKR in September. His operation was cancelled on day of surgery in a regional hospital last week.

Background

- Morquio syndrome:- type IV mucopolysaccharidosis. Usually presents with skeletal deformities, short stature and possible upper cervical instability and cardiac deformities. Potential for narrowed tracheal lumen, sleep apnoea, hypermobility and prominent sternum.
- Short stature (135cm)
- OSA diagnosed 5 years ago. Has not taken up CPAP therapy as recommended due to cost
- Smoker
- Glucose intolerance
- Previous bilateral hip replacements – reportedly under general anaesthetics

He works at the local Leagues club and his exercise is limited by his osteoarthritis. His only regular medication is paracetamol PRN. Unfortunately he continues to smoke - had been advised to cease. He reports no concerns with previous anaesthetics. His surgery was cancelled in Tamworth due to concerns about his high-risk status for anaesthesia.

His vital signs were normal. His cardio-respiratory exam was essentially normal, and he had a reasonably normal airway exam. He has previously had a Grade II laryngoscopy. Recent pathology was normal.

He has had a spirometry, echocardiogram, flexion/extension cervical spine x-rays, and MRI of his spine in work-up for this surgery. His spirometry was essentially normal with an FEV1 of 2.3L. His echocardiogram and flexion/extension cervical spine x-rays were normal. His MRI of his spine showed no spinal cord abnormalities, with the conus medullus at the level of L1. His vertebral bodies were abnormal as expected due to his Morquio syndrome.

Discussion

- GA vs Spinal – there were debates about what is the best approach. There was agreement that there are no absolute contra-indications to either approach.
- Patient reasonably optimized for surgery given the results of investigations
- Many different reasons why possible cancellation on day of surgery. Patient reported he had been told that he was sent to us because “we have a spinal needle with a camera on the end of it!”
- Note this is a Mucopolysaccharidosis type IV – less severe subtype of these metabolic disorders

Outcome

Patient to proceed to planned surgery
Assess for HDU postoperatively due to history of possible OSA.

TOPIC 4

Malignant Hyperthermia in distant relative

A 50 year old women, was booked for a minor hand procedure which can be quite reasonably done under a regional anaesthetic. The patient gave a history of malignant hyperthermia and reported with great anxiety that this was of great importance for avoiding general anaesthetics. It turned out that she had a distant (4th degree) relative who had tested positive for malignant hyperthermia in the past. No further details were available. Nevertheless, the extended family had taken this on board and has been avoiding GAs or having “trigger free” anaesthetics for some 15 years. The patient’s mother (the 3rd degree relative) had had multiple anaesthetics without incidents, some before the history of MH occurred and some afterwards. The calculated risk for the patient of being MH positive would be at most 6.25% but in reality much less. What should be advised about management?

Discussion:- Giving a 'trigger-free anaesthetic' is no great challenge, but there is arguably a problem of inappropriate anxiety in the family, where the reality of the risk must be approaching the background population risk. Given the anxiety, it is suggested the appropriate way forward is to refer to the MH lab in Sydney (Children's Hospital Westmead) for further counselling/evaluation. If testing is considered to be indicated, their procedure is to find the closest relative to the index patient and to test them. Genetic testing has not proven to be as useful as was originally hoped, and is not useful for initial screening

Outcome:- Go ahead with surgery as planned using Regional or Trigger-free anaesthetic. Follow-up of MH issue should be referred to CHW but is non-urgent

TOPIC 5 *Perioperative Immunisation under anaesthetic*

A 16 year old patient booked for an elective ENT procedure has a severe needle phobia. As a result she has not had any immunisations since early childhood. The family (and the patient) request that immunisation be performed during the anaesthetic. Is this a reasonable request? Would the vaccination be effective at this time? Would it interfere with surgery?

Discussion:- This topic has been an issue of some controversy, particularly about 2006-7, when there were various views 'in the literature'. A useful statement has been produced by the Association of Paediatric Anaesthetists of Great Britain and Ireland (attached).

It is suggested that vaccination with a inactivated vaccine one to two days prior to surgery may be unwise as, the febrile response to the vaccine may confuse observations at the time of surgery. (i.e. suggest the patient is having an early febrile illness, and lead to cancellation of surgery etc) For live attenuated vaccines this may not be a consideration. It is unlikely to be an issue regarding vaccination at the time of minor surgery,

With regard to the effectiveness of the vaccine, although the immune system may be somewhat suppressed by the effects of surgery (particularly major surgery) the efficacy of the vaccines is such that there is still high immunisation success. Thus the efficacy of the vaccine given at the time of surgery would be equivalent to that given at any other time. There is an argument that giving paracetamol to suppress fever may reduce the effectiveness of inactivated vaccines.

It could be argued that agreeing to the request plays into the psychological turmoil arising from the patient's background, and reinforces dysfunctional behaviours and psychological dynamics, and "adds fuel to the fire". That said, the benefits of improving the patient's vaccination status are such that it would seem appropriate to go along with the family request, and allow the long-term psychological and behavioural issues to be dealt with elsewhere. Thus it was agreed that as long as there was informed consent (given the patient's age and competency status), it was appropriate to go ahead as requested.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 15th September 2016. Publication 28th September 2016.

ASA National Scientific Congress - ERAS Satellite Meeting (Friday the 16th)

This meeting was held in the new building of the Peter MacCallum Cancer Centre in Melbourne. It is a spectacular building adjacent to the Royal Melbourne Hospital, and will be the centrepiece of cancer care in Victoria. Particular highlights included:-

Principles and Experience of Implementing ERAS

Olle Ljungqvist, Swedish surgeon and one of the pioneers (with Henrik Kehlet and others) of Enhanced Recovery After Surgery (ERAS) spoke about various scientific/clinical aspects of ERAS but particularly the challenge of effective and sustained implementation.

Background:- There is growing international interest in the principles of ERAS:- In particular, there has been a sharp uptake of interest in the United States. The “political/funding” climate is changing dramatically, with a major shift towards funding of surgical programs in hospitals through accountable care organisations (ACO’s), and funding from both government programs (Medicare & Medicaid) and through insurers based on 'bundled payments'. Until recently, most hospital activity was funded on a clinician-focused fee-for-service basis, so that any clinician activity generated income for the hospital, although there were increasingly complex constraints from insurers. Broadly speaking, there has been a rapid change in the last few years, which is gathering speed, and it is anticipated that most hospital surgery will be funded on the basis of “bundled payments” in three years. This funding methodology produces a focus on defined (patient-centred) outcomes rather than clinician activity, and means (in principle) that the hospital gets funded for performing an overall episode of surgery rather than individual items of clinician activity within a particular episode of surgery for a patient. This is driving a sharp increase in interest in models such as ERAS. This is also reflected in the American Society of Anaesthetists controversial promotion of the 'Perioperative Surgical Home' model of care. (ERAS largely overlaps with the organisational ideas of the 'Perioperative System' in Australia). All aim to improve quality and reduce the overall costs of a surgical episode of care for a patient by improving the implementation of evidence based strategies to optimise patient outcome and improve efficiency.

Ljungqvist reports that there is now a broad awareness of ERAS with 40% of hospitals surveyed in Europe and US reporting that they have “ERAS protocols in place”, however there is minimal data on compliance with protocols or on completeness of implementation. ERAS implementation is assessed by compliance with the number of different components of the ERAS model. There have been a number of studies of compliance demonstrating an association between overall implementation rates of the various components with better outcomes (UO Gustafsson 2011, as well as others. Gustafsson has recently repeated the 2011 study, in press)

Many hospitals use an 'ERAS implementation project' approach with an “ERAS Nurse” or “team” however the challenge then becomes the sustainability after implementation. He reported new (unpublished) data showing deterioration in outcomes when the active implementation phase finished. He argues that a traditional reductionist scientific approach (i.e. trying to identify which individual component of an ERAS programs has a measurable significant effect on outcomes) has not been useful. It is difficult to show that any single component of an ERAS Program makes a difference, however the whole package together makes a difference to both to patient outcomes and to efficiency of care in a “dose response fashion”.

Ljungqvist also discussed the principles of oral carbohydrate loading before surgery. He suggests that the metabolic response to injury is analogous to acute insulin resistance. Conceptually, surgery induces a type 2 diabetes response. He suggests that fluid therapy using 'simple' glucose drinks (soft drinks, sports drinks, apple juice etc) does not give sufficient carbohydrate load to induce an insulin response during the fasting time before surgery. The complex carbohydrates used in specialised preoperative fluids are asserted to be a significant component of the effectiveness of inducing an insulin response preoperatively in the fasting period,

and this ensures that the patient is not catabolic at the start of surgery. He references the www.erassociety.org website for references on this and other issues, although the site appears to be mainly focussed on implementation and audit programs.

1: Gustafsson UO, Hausel J, Thorell A, Ljungqvist O, Soop M, Nygren J; Enhanced Recovery After Surgery Study Group. Adherence to the enhanced recovery after surgery protocol and outcomes after colorectal cancer surgery. *Arch Surg.* 2011 May;146(5):571-7. doi: 10.1001/archsurg.2010.309. Epub 2011 Jan 17. PubMed PMID:21242424.

2: Nygren J, Thorell A, Ljungqvist O. Preoperative oral carbohydrate therapy. *Curr Opin Anaesthesiol.* 2015 Jun;28(3):364-9. doi:10.1097/ACO.0000000000000192. Review. PubMed PMID: 25827282.

Exercise as therapy for Cancer??

Associate Professor Prue Cormie, an exercise physiologist from ACU Melbourne talked about the value of exercise before surgery. It was a somewhat enthusiastic presentation. She reports increasing evidence of benefits from pre-operative exercise programs in the cancer surgery setting. Benefit is reported affecting multiple dimensions, including patient experience and sense of control and well-being, but also 'hard' outcomes including reducing the risk of perioperative mortality. There is early suggestion that there may be reduction in tumour growth and cancer recurrence. The mechanisms of the later are unclear however it is suggested that preoperative exercise primes the body's immune system and antioxidant mechanisms and this augments the body's immune response to cancer. There are some weaknesses in the data on this point in particular - even with the best risk adjustment, it can be suggested that patient uptake of exercise programs may reflect otherwise hidden effects of cancer growth & spread. (i.e. patients with hidden metastatic disease may exercise less). Strong trials using exercise interventions on an intention to treat basis are needed. She reports some recent studies are producing this evidence - Those in press are not as clear as she asserts.

The evidence for preoperative exercise becomes strong with a 4 week lead up to surgery. (In the cancer setting this may well coincide with the period of Neoadjuvant Chemotherapy.) For optimal benefit, it is suggested that exercise therapy should be prescribed as a "medicine". She suggests that this should be 150 minutes of moderate aerobic capacity per week, and 2 to 3 sessions of moderate intensity resistance exercise. This has to be individually tailored and progressed. For sceptics, it was notable that the photos accompanying the presentation were of notably fit individuals undergoing exercise therapy:- it would be reassuring to see evidence of benefit in the more frail aged patients having cancer surgery.

1: L. Loughney et al. / *EJSO* 42 (2016) 28e38

Strategies for Engaging Clinicians in Changing Hospitals

Dr Martin Kuper, Anaesthetist & Medical Director of Homerton University Hospital (London) gave presentations about the barriers and challenges to setting up an enhanced recovery program for surgery. He reinforced the message that compliance with the overall program improves outcomes but there is no evidence for any single component. He referenced 'classic' papers about quality improvement & change in hospitals by Richard Bohmer from the *New England Journal of Medicine*, in particular "The four habits of highly effective hospitals". A recurrent theme on the day had been the 'protocolised' approach that is the basis of ERAS, and the tendency for this to lead to resistance from clinicians. As an alternative, he discussed the approach used by Intermountain Healthcare in the US. They aim to have a 'protocol' (or pathway, etc) for all significant processes, but make it very clear that staff are free to vary from the protocol at will. The only institutional requirement is that staff making a variation from protocol but must write down and reports of why staff wish to vary from the protocol. These reports are then actively reviewed and the "whys" are seen (and valued) as an opportunity to identify strategies to change or improve care. Thus the protocols are seen as a default 'suggestion', but are not seen as a punitive or clinically restrictive imposition on staff. (Somewhat reminiscent

of classical WE Deming methods). They also emphasise respecting patient's time and have a general theme of reducing the "red time" i.e. the time when there is nothing being done that adds value to care.

1: Bohmer RM. The four habits of high-value health care organizations. N Engl J Med. 2011 Dec 1;365(22):2045-7. doi: 10.1056/NEJMp1111087. PubMed PMID: 22129249.

2: Bohmer RM. The Hard Work of Health Care Transformation. N Engl J Med. 2016 Aug 25;375(8):709-11. doi: 10.1056/NEJMp1606458. PubMed PMID: 27557297.

3: Bohmer RM. Leading clinicians and clinicians leading. N Engl J Med. 2013 Apr 18;368(16):1468-70. doi: 10.1056/NEJMp1301814. PubMed PMID: 23594000.

Practical Aspects of Fluid Therapy in ERAS

Lawrence Weinberg from the Austin Hospital in Melbourne talked about individualised fluid management and their approach. They are clinically 'pushing the envelope' of haemodynamic optimisation with increasingly restrictive fluid therapy. They use advanced monitoring as an aid to achieving haemodynamic optimisation. He did not advocate any particular form of monitoring. He made the point (quite nicely) that "Goal Directed Fluid Therapy" is about a goal whereas "Haemodynamic Optimisation" is about a patient. Even they use fluid restrictive therapy intraoperatively, they note that patients will still tend to gain fluid intra and immediately peri operatively (due to both physiological responses and due to therapeutic interventions). They are 'gaining experience' with using frusemide to 'strip fluid off patients post-operatively when stable' (e.g. 2 days post operatively after major surgery).



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 18th August 2016.
Publication date 23rd August 2016.

Attendance: Ross Kerridge, Daniel Orr, Claire Wohlfahrt, Paul Healey

TOPIC 1: *Beyond Cancellation*

An 86 year old male booked for TURP. Multiple comorbidities (atrial fibrillation, diabetes, hypertension, TIAs 2009 and 2014, PE 2015). History of bowel cancer treated with palliative radiotherapy. CCF Poorly controlled – sleeps at 45 degrees due to orthopnoea. Has had obstructive urological symptoms for some months and now has an IDC in situ. The patient had been sent for assessment for fitness for surgery, but it rapidly became clear that the patient was accepting of the IDC, and was concerned about undergoing surgery. Needless to say this surgery was shared by the anaesthetist!

Discussion:- Not for surgery. But we should be Perioperative physicians, not 'just' gatekeepers. It appeared that the patient's cardiology status had not been reviewed for about 12 months or more, perhaps due to distraction by concern about bowel cancer and other pathologies. Thus the letter to the surgeon and GP should draw attention to the need to review the patient from the cardiology point of view to optimise his treatment and symptoms, regardless of going ahead with surgery.

TOPIC 2: *Intercurrent Goitre*

A 67 year old female was booked for laparoscopic cholecystectomy due to ongoing symptoms of biliary colic. Multiple comorbidities including hypertension, diabetes, BMI 41, and severe OSA treated with mask CPAP. It was also noted that the patient had a multinodular goitre which symptomatically was affecting her swallowing and (perhaps) causing exertional dyspnea. A CT scan showed no tracheal obstruction, and on that basis it was not being treated at this stage.

Discussion:- Iodine used during a laparoscopic cholecystectomy may have an influence on the goitre (Note - is this really a problem or a medical myth?). Regardless of the apparently reassuring CT scan findings, the symptomatic obstruction, particularly with the OSA, would suggest that it would be well worth considering doing simultaneous (sequential) thyroidectomy and cholecystectomy. ("We treat patients, not CT scans".) Similar management had been planned with a recent patient. This was to be discussed further with the surgeon.

TOPIC 3: *Hysterectomy*

An 82 year old female booked for hysterectomy +/- pelvic floor repair. Past history of TIAs, now on clopidogrel. Bronchitis and CCF, plus other comorbidities. Has severe uterine prolapse causing significant effects on quality of life, disabling from a social point of view. An echocardiogram had been ordered which showed a 6 cm ascending thoracic aortic aneurysm.

Discussion:- Why was the echo done in the first place - would it change management? There is about 12-15% risk of rupture of this aneurysm in the next 12 months, but given the symptomatic effect of the prolapse, surgery should still go ahead. It was suggested that in view of the aneurysm, an 'abundance of caution' with regard to blood pressure and heart rate changes would be appropriate:- although there is no evidence for this. Suggest that surgery should be limited e.g. pelvic floor repair rather than the hysterectomy.

TOPIC 4:

You can't win them all

A 60 year old socially challenged male was booked for a knee replacement. He was noted to have multiple comorbidities (OSA, Obesity Hypoventilation Syndrome, past head injury, mental health issues, diabetes, smoker, chronic pain, poor functional capacity, BMI 51.) He had previously been postponed as unsuitable in his then state of health. When reviewed three months later it was found, somewhat surprisingly, that he had stopped smoking, lost 8 kilo's, and his diabetes control was better, and was now medically optimised. The surgeons were keen to go ahead based on the severity of symptoms, and confidence that these symptoms would be improved by knee replacement. On that basis, despite the inherent risks of surgery, he was accepted for surgery. Surgery did not proceed as two days after being accepted for surgery he was found passed away.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 21st July 2016.

Publication date 1st August 2016.

Attendees: Ross Kerridge, Julian Baldwin, Rhys Thomas, Pragma Ajitsaria, Sarah Crosby, Michael Hicks, John Prickett

TOPIC 1: *Inadequate follow up of previous cardiac event:-*

A 73 year old presents for an elective total hip replacement, reporting that she is generally well. Background history includes that 13 months previously she had a short episode of cardiac-type chest pain and presented to hospital. At that time had a single troponin test (normal) and ECG performed showed no acute changes. She was sent home after observation. Background risk factors of high cholesterol, hypertension treated with ACEI, and a positive family history. At that time she was referred for follow up exercise stress test however didn't do this and has had no follow up since. She ceased taking a statin by personal choice, and instead is taking turmeric as cardio prophylaxis. She has no cardiac symptoms, but is difficult to assess exercise tolerance due to hip pain. ECG (now) shows LBBB that was not present 13 months ago.

What investigation are appropriate now? Would it be appropriate to advise the patient to recommence a statin and aspirin, and go ahead with planned surgery without further investigations given that she is otherwise asymptomatic for ischemic heart disease? Should clonidine into the operative site (the current therapy favoured by the surgeon) be avoided to avoid lower blood pressure post operatively?

Discussion:- The overlapping roles of primary health care and peri-operative medicine is coming up more and more frequently - are/should we as perioperative physicians, now be responsible for picking up the primary health care issues that fall through the net or will we be over-investigating patients and over-delaying patient procedures?

Should follow-up be directed back to the GP (which has already 'failed') or harness extra patient motivation by linking follow-up with access to surgery? Arguably, she has had no further symptoms since, and is now 'healthy', so guidelines would suggest no cardiac investigation.

Even though the patient is 'healthy', it is an elective case, and complete cardiac assessment is appropriate. But what test? EST, Sestamibi, Coronary CT angiography or cardiology referral before any test? Discussion with cardiologist - a diagnosis is required before being able to say if she is optimised or not - sestamibi would be appropriate but quickest/ easiest way to arrange this for our institution is a CT angiogram.

Outcome:- THR postponed, CT angiogram organised - (NB be aware that for this test, the patient needs to have their heart rate controlled so sometimes B-Blocker or ivabradine is used to make the results interpretable. Atrial fibrillation makes interpretation more difficult. Iodine contrast load is comparable to coronary angiography).

Update:- CCTA report 'There is disease in the proximal LAD where there appears to be a significant stenosis present (60-70%)'. Further discussion with cardiology – This is a common weakness of CCTA studies (i.e. confusing results in moderate disease. Arterial wall calcium (common in older diabetics) is a particular problem. The ideal role for CCTA to exclude disease in patients such as atypical chest pain, low risk-factors, and an unclear Exercise Stress Test. Suggest that this 'moderate' result needs nuclear perfusion study to clarify if this reported stenosis is physiologically significant.

A good recent reference on the different methods of assessing cardiac ischemia, which has great summary boxes, an algorithm and explanations of how to stratify patient risk and why do what test for which patients...It's not directed towards anaesthetists but a useful read...

(See Reference attached)

TOPIC 2: Previous Bleomycin therapy & Oxygen exposure

A 32 year patient had a history of a germ cell tumor in the mediastinum that had been treated with Bleomycin some 12 months previously. What is the current recommendation regarding oxygen toxicity?

Discussion:- This issue remains controversial. It is traditionally recommended that high oxygen intake should be avoided for at least 12 months. Recent reviews are more cautious if the patient has had reactive oxygen toxicity, "high oxygen intake should be avoided for life". If there has been no reactive oxygen toxicity some current references recommend avoiding high inspired oxygen toxicity for life regardless. The evidence for this is 'not strong' (i.e. largely anecdotal). Pragmatically, it seems that after about twelve months the lowest reasonably achievable inhaled oxygen level should be used for 'life'.

(see attached reference)

TOPIC 3: "Palliative Hip Replacement" in a high risk cardiac patient

A 72 year old male with severe non-malignant hip pain is scheduled for a hip replacement. Patient has a history of a dilated cardiomyopathy with EF 35% or less. Nevertheless, he remains quietly active doing small jobs around the house, caravan park, as pain allows. His cardiologist has investigated & reviewed him recently and said "he should never have an anaesthetic". What is the appropriate management?

Discussion:- Going back to the cardiologist (in this case) was felt unlikely to be productive. Given the recent cardiology investigations, there was no point in any further investigations. A possible strategy would be to refer to a second cardiology opinion, but this should be organized through the general practitioner to avoid ethical conflicts. Alternatively, it would be reasonable to discuss the risks with the patient in detail and suggest the patient consider seeking a second opinion if they wish. Ensure the patient has time to act on this choice. If the patient and family was comfortable with the known risk, then surgery could go ahead. An anterior approach may reduce the overall risk. Hip replacement is an operation with great potential to improve quality of life. It would seem clear that the cardiologist is unnecessarily cautious.

The NSQIP Database was consulted out of interest. It suggested that the patient with these risk factors had a complication rate of 6.6%, a nursing home destination (at least temporarily) of 30%, and a perioperative death rate of 0.6%.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 22nd September 2016. Publication date 29th September 2016.

Attendance: Keith Streatfeild, Rebecca Scott, Rhys Thomas, Peter Harrigan, Paul Healey, Bernie Frost, Gary Leung, Ross Kerridge,

TOPIC 1: *Charting of regular medications*

There was recently a serious adverse event (in another hospital) associated with a patient who had a cardiac arrest two days post operatively. The patient’s regular medications (including beta blocker) had not been charted. There have been multiple similar events in the past. This shows a system weakness, whereby patients may arrive on the ward post-operatively without regular medications being charted. The patient may not arrive on the ward until late after-hours when the “home team” RMO has gone home. The problem is well-recognised in many hospitals.

Discussion:- Should anaesthetists in theatre chart regular medications? There were a variety of strong opinions. It was noted that it is common but by no means universal practice in the private sector for the anaesthetist to chart the regular medications (more or less under the direction of the surgeon). However the relationship between surgeon and anaesthetist in the private sector is more familiar and close than in large public hospitals. (But why is this so?). About 70% of all elective surgery in Australia is done in the private sector. The advent of electronic prescribing systems may change the “ecology” of this problem. A partial solution would be to institute a “safety check point”, mandating that the patient should not leave recovery to go to the surgical ward until their regular medications have been charted, regardless of who charts them. No doubt there will be more discussion on this topic.

TOPIC 2: *Severe Chronic Airways Disease*

A 75 year old gentleman with severe chronic airways disease had been booked for a knee replacement. He had an ICU admission in May with respiratory failure, but since then has completed a pulmonary rehabilitation program (8 weeks), and respiratory physicians now feel that he is in the best state he will ever be. Resting saturation is 89%, which deteriorates to 73% on walking around the waiting room, then reasonably promptly returns to baseline at 89%. Despite the alarming saturations, he has a measured a 6 minute walk test of 330metres, and remains active. His life includes going beach fishing for hours at a time on multiple days of the week. He continues regular walking and using an exercise bike. He understands the risks of surgery and that there is no potential to reduce this further.

Discussion:- The patient has a clear understanding of the risks, and strongly attests that his quality of life is restricted by a knee pain rather than respiratory limitations. He appears to be stable, albeit with disconcerting oxygen saturations, but has maintained cardiac reserve. It was agreed that it was appropriate to go ahead with a spinal anaesthetic including intrathecal morphine plus local anaesthetic nerve block catheters to provide optimal analgesia without systemic opiates, give minimal sedation, and use prednisone to reduce PONV from intrathecal morphine.

TOPIC 3: *Management of Antiplatelet Therapy*

A 50 year old lady with a very significant history of ischaemic heart disease is booked for laparotomy for removal of left adnexal mass, frozen sections etc. History of a cardiac arrest in 2008 with a stent to right coronary artery at that time. After follow-up coronary catheterisation for mild IHD symptoms this year she had a DES to the right coronary artery in June this year. The surgeon had sought advice from the cardiologist (non-local, and not associated with this hospital), who has replied with a written response that the patient may go ahead with surgery off all antiplatelet agents after September 2016 (ie 3 months).

Discussion:- It was felt that despite the cardiologist's advice, the surgeon should be advised to maintain the patient on aspirin and to minimise the time off Plavix. Further, agreement from the local cardiologists, (who will be the ones looking after patient if there are post-operative issues) should be sought. There was no place for Clexane "bridging" which has no scientific basis (anticoagulant rather than antiplatelet agent), and may give a false sense of security, as well as adding other potential for morbidity. Tirofiban has been used in other centres, but is often regarded as "a bridge too far" in the absence of overt coronary ischaemia.

There have recently been published revised guidelines suggesting that the traditional recommendations for management of drug eluting stents maybe too conservative, particularly with the new generation of stents. *Circulation*. 2016;134:e123–e155 (Summary of Key Points attached)

The post-operative management of antiplatelet therapy needs to be planned and should be documented. In general, it would be reasonable to restart on the usual dose when the surgeon is agreeable, but if there are any symptoms suggestive of an impending acute coronary syndrome, the patient should be given a loading dose of clopidogrel.

TOPIC 4: Surgeons recommendations and Warfarinisation

There have been cases where surgeons have made comments in pre-operative letters or bookings for admission indicating that a patient on warfarin will need to have "bridging" with alternative anticoagulation (eg clexane). For most patients this is now regarded as unnecessary, based on the results of the BRIDGE Trial published in late 2015. Similarly, patients on NOACs should also be able to be managed without alternate anticoagulation (assuming that NOACs are given according to accepted indications, which are within the BRIDGE trial criteria) . Therefore it is reasonable in general to not give alternative anticoagulation, and communicate with the surgeons about the change in recommendations based on these trials.

ABSTRACT of the BRIDGE Trial

Perioperative Bridging Anticoagulation in Patients with Atrial Fibrillation

James D. Douketis, M.D., Alex C. Spyropoulos, M.D., Scott Kaatz, D.O.,

N Engl J Med 2015;373:823-33.

BACKGROUND

It is uncertain whether bridging anticoagulation is necessary for patients with atrial fibrillation who need an interruption in warfarin treatment for an elective operation or other elective invasive procedure. We hypothesized that forgoing bridging anticoagulation would be noninferior to bridging with low-molecular-weight heparin for the prevention of perioperative arterial thromboembolism and would be superior to bridging with respect to major bleeding.

METHODS

We performed a randomized, double-blind, placebo-controlled trial in which, after perioperative interruption of warfarin therapy, patients were randomly assigned to receive bridging anticoagulation therapy with low-molecular-weight heparin (100 IU of dalteparin per kilogram of body weight) or matching placebo administered subcutaneously twice daily, from 3 days before the procedure until 24 hours before the procedure and then for 5 to 10 days after the procedure. Warfarin treatment was stopped 5 days before the procedure and was resumed within 24 hours after the procedure. Follow-up of patients continued for 30 days after the procedure. The primary outcomes were arterial thromboembolism (stroke, systemic embolism, or transient ischemic attack) and major bleeding.

RESULTS

In total, 1884 patients were enrolled, with 950 assigned to receive no bridging therapy and 934 assigned to receive bridging therapy. The incidence of arterial thromboembolism was 0.4% in the no-bridging group and 0.3% in the bridging group (risk difference, 0.1 percentage points; 95% confidence interval [CI], -0.6 to 0.8; P = 0.01 for noninferiority). The incidence of major bleeding was 1.3% in the no-bridging group and 3.2% in the bridging group (relative risk, 0.41; 95% CI, 0.20 to 0.78; P = 0.005 for superiority).

CONCLUSIONS

In patients with atrial fibrillation who had warfarin treatment interrupted for an elective operation or other elective invasive procedure, forgoing bridging anticoagulation was noninferior to perioperative bridging with low-molecular-weight heparin for the prevention of arterial thromboembolism and decreased the risk of major bleeding. (Funded by the National Heart, Lung, and Blood Institute of the National Institutes of Health; BRIDGE ClinicalTrials.gov number, NCT00786474.)



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 25th August 2016. Publication date September 2016.

Attendance:

TOPIC 1:



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 28th July 2016.
Publication 4th August 2016.

Attendees: Kim Rackeman, Ross Kerridge, Paul Healey, Michael Mould, Michael Hicks

TOPIC 1:

STOPBANG Score

A patient with STOPBANG Score of 5-6 has never been investigated for OSA. Should surgery be postponed for formal sleep studies? This may require considerable delay.

Discussion:- As generally used, the STOPBANG Score has high sensitivity but low specificity. Note that the criteria for positive scores are more severe than is commonly practiced. Note:- "**S**" requires loud snoring ("loud enough to be heard through a closed door"). Similarly, "**T**" - is more than common tiredness and implies daytime somnolence ("such as falling asleep during driving or talking to someone").

If positive, the outcome of sleep studies may be to recommend a trial of CPAP, however this requires 6 to 8 weeks if not longer to get full benefit in the case of pulmonary hypertension etc.

Frances Chung and her colleagues have established a comprehensive STOPBANG resource website, (www.stopbang.ca) which includes some pragmatic perioperative management guidelines developed in Vancouver. They suggest that for many patients it may be appropriate to use STOPBANG combined with clinical review to triage the patient, after consideration of surgical risk factors and urgency, proceed to surgery cautiously but without formal studies, with postoperative intervention as needed, using CPAP postoperatively if necessary.

For this patient. STOPBANG score should be combined with assessment using history & clinical signs. Consider echocardiogram looking for evidence of pulmonary hypertension or right heart failure or diastolic dysfunction. Note 'hidden' resting hypoxaemia due to sub-clinical Pickwickian syndromes, where saturation may be raised by voluntarily increasing ventilation. Check for HCO₃ retention on biochemistry. Even if there is no time to start therapy, echo assessment may guide triage for HDU post operatively. Anaesthesia management should consider risk of OSA (i.e. optimize non-opiate analgesia etc). Postoperative reassessment in PACU.

What is the role of overnight oximetry as a screening/assessment tool? Is this a useful alternative to formal Sleep Medicine consultation and Polysomnography?

This was discussed with the Shyamala Pradeepan, JHH Department of Respiratory Medicine. She (and they) accept the limitations of STOPBANG, and the problem of access to formal sleep studies. They recommend that patients suspected at high risk of OSA in the perioperative clinic be referred immediately (i.e. prior to respiratory consultation) for overnight oximetry as a further screening test. Overnight oximetry can be organized on a "walk-in basis" through the respiratory laboratory, with next-day reporting. This can then be used as a triage tool for perioperative management, or for respiratory consultation, viz:-

- Normal:- Proceed with normal caution
- Abnormal:- Postpone elective surgery & refer for Respiratory or Sleep Medicine consult.
- Severely Abnormal:- expedited consult;
- Urgent Surgery & Abnormal Oximetry:- Use result to triage postoperative management, particularly to mandate HDU admission, and/or early CPAP.

References:-

Chung F1, Liao P, Elsaid H, Islam S, Shapiro CM, Sun Y. Oxygen desaturation index from nocturnal oximetry: a sensitive and specific tool to detect sleep-disordered breathing in surgical patients. *Anesth Analg.* 2012 May;114(5):993-1000. (Reference includes an introduction as follows:- "It is impractical to perform

polysomnography (PSG) in all surgical patients suspected of having sleep disordered breathing (SDB). We investigated the role of nocturnal oximetry in diagnosing SDB in surgical patients.”)

Patel MR, Davidson TM. Home sleep testing in the diagnosis and treatment of sleep disordered breathing. Otolaryngol Clin North Am 2007;40:761-84.

Chung F, Liao P, Sun F, et al. Nocturnal oximeter: a sensitive and specific tool to detect the surgical patients with moderate and severe OSA. Anesthesiology 2009;111:A480

TOPIC 2: *Power of Attorney*

An elderly patient with mild/moderate cognitive impairment was booked for elective surgery. Review of the notes on the day before noted that the consent had been signed by a person listed as “power of attorney” is this appropriate?

Discussion:- Power of Attorney is a specific legal term with relevance to legal and financial decisions. It is not relevant to health decisions. The correct person for medical consent is the patient’s guardian (which may include enduring guardian). Pragmatically, (given the time frame) the patient was seen on arrival. It transpired that the person with legal power of attorney was also the guardian, so the case was able to proceed regardless.

NSW Government Land & Property Information - Powers of Attorney in NSW Fact Sheet – Attached

TOPIC 3: *Rivaroxaban management in a complex patient*

71 year old man presented to Perioperative clinic for assessment prior to left pyeloscopy, laser +/- stent procedure for asymptomatic 6mm renal stone. He is on rivaroxaban, which the surgeons have requested should be stopped for ten days preoperatively.

Background:-

1. Ischaemic heart disease
 - AMI 1990
 - Recent myocardial ischaemia associated with a CVA (April 2016)
 - Anterior hypokinesis on recent echocardiogram with EF 50%
2. AICD/Pacemaker
 - Episode of VT in 2009 with associated myocardial ischaemia
 - Nil symptoms following insertion
3. Cerebrovascular disease
 - Left parieto-temporal thrombo-embolic CVA in April 2016, associated with speech and memory deficits. Progressed to haemorrhagic transformation after anticoagulation. He required an extensive hospital admission and rehabilitation. He is able to drive now. (!!)
 - 30 – 40% stenosis of bilateral internal carotid arteries
 - Occluded left vertebral artery
4. Peripheral vascular disease
5. Type II Diabetes Mellitus
 - Managed with oral hypoglycaemic agents. BSL well controlled
6. Chronic renal impairment

- eGFR – 51 ml/min
- Likely secondary to hypertension and diabetes

7. Ex-smoker – ceased 20 years ago. Denies respiratory disease

His medications include: Rivaroxaban, perindopril, metoprolol, pravastatin, spironalactone, linagliptin, metformin and fish oil. He reports being independent with ADLs and is still able to mow his lawn at home.

On examination his vital signs were within normal limits. His cardiorespiratory exam was unremarkable. His ECG had old anterior Q waves and T wave inversion. His recent pathology was significant only for his chronic renal impairment.

The patient reported never having symptoms of the renal stone. The stone was found on investigations for other problems.

Questions:

What is the appropriate management of Rivaroxaban? (Surgeons request ten days cessation)

- The surgery was booked prior to his recent (April 2016) stroke. - Do the benefits of the surgery outweigh the risks? If so, should the patient be referred back to the surgeon for re-consideration of surgery?

Discussion:-

A much shorter period of rivaroxaban cessation (e.g. 2 days) should be sufficient for pyeloscopy. Consideration could also be given to slightly longer and using clexane bridging. But the 'real question' is the appropriateness of surgery.

Outcome

- The patient was eager not to have surgery.
- His case was discussed with his Cardiologist who described him as “super high-risk”, and prone to “undertaking heroic activities and falling in a heap”.
- He was then discussed with the Urologist, and there was agreement that the surgery should be cancelled and his stone managed on a symptomatic basis.
- A letter documenting this decision was sent to the Urologist, copied to the GP to inform his treating doctors of the consensus of opinion.

TOPIC 4: *Simultaneous thyroidectomy and laparoscopic cholecystectomy*

Patient with intermittent systems of cholelithiasis - requiring laparoscopic cholecystectomy in the near future - also has Graves Disease with fluctuating levels of activity (currently off carbimazole). It has been difficult to control, and there are issues with medication compliance. The surgeon has scheduled the patient for simultaneous thyroidectomy and cholecystectomy. Is it appropriate to do both operations with the same anaesthetic? If so, in what order? Are there any other considerations?

Discussion:- There needs to be clarification of the indication for thyroid surgery with the endocrinologist. Doing imaging during the cholecystectomy could give a dose of iodine which may exacerbate the thyroid disease (unlikely to be an issue on the day of surgery, but a justification for doing the thyroid at the time of lap.chole). Surgical stress is regarded as a possible precipitant for a thyroid storm. It was agreed that it is reasonable to go ahead with surgery under the same anaesthetic. There was some discussion about how this should be managed at the time of surgery. The raised intra abdominal pressure may cause venous congestion around the thyroid, although this may be compensated for by a head-up posture. Particular postoperative observation for airway oedema/haemorrhage & obstruction.



“From the Trough”

Perioperative Interest Group Notes

Based on Cases discussed at the Weekly PIG Clinical Meeting on 29th September 2016. Publication date 6th October 2016.

Attendance: Paul Healey, Ross Kerridge, Peter Harrigan, Rebecca Scott, Claire Armstrong, Michael Hicks

TOPIC 1: *High-Stakes Consultation for Remote patients*

An Octogenarian Female was referred from gynae-oncology for consideration of suitability for laparotomy for removal of complex uterine mass. The mass is thought to be most likely non-malignant, but there is slow growth documented on imaging, and malignancy may be present. The patient comes from considerable distance, and in another health service. The surgeons want an opinion on the patient’s suitability for surgery. The patient does not wish to travel from her home town for this assessment. Information gathered from the previous records and from the GP confirms the comorbidities as reported by the surgeon, and are suggestive that conservative management, however this is not definite. Where to from here?

Discussion:- Discussion with the GP is clearly the best first line. This may clarify what the patient’s concerns are, and the GP may clarify that the patient the patient’s degree of preference regarding pursuing a surgical option. This may not adequately resolve the issue. It has been suggested by the surgeons that assessment by an anaesthetist in the remote centre (a provincial city) may be appropriate. The senior anaesthetist there is understanding, willing to be involved ‘in principle’. However, the anaesthetic clinic in the remote centre is already overloaded. Etiquette (and legally?) this requires referral from the GP, with agreement of surgeon. Video conferencing was suggested but there is currently no arrangement for this to be managed with the distal Health District. (The patient would be required to attend a clinic somewhere to set up videoconferencing). Administrative liaison between health districts will be required to set this up. GynaeOncology may be able to assist this. It was suggested that Skype or Facetime could be used. Skype is problematic from internal hospital computers, but apparently can be organised with advanced notice. Facetime is entirely a ‘private’ facility. The various ramifications of issues relating to telemedicine are evolving. The Medical Board of Australia has been considering some issues relating to telemedicine, although this has mainly focussed on teleconsulting and tele-prescribing, particularly in non-mainstream medicine. The general feeling was that it was probably not appropriate to go ahead with surgery, but some sort of face to face consultation (even if a live video link) would be appropriate. Liaison with the GP is the best interim strategy.

TOPIC 2: *Laparoscopic Hemicolectomy*

A 60ish year old male is booked for a Laparoscopic Hemicolectomy, following an unexpected diagnosis of a non-functioning carcinoid tumour with positive margins diagnosed after an emergency laparoscopic appendicectomy one week previously. The hemicolectomy is indicated to clear the margins of the tumour. The patient’s past history includes multiple cardiovascular risk factors. Active smoker, alcohol, obese, Type 2 diabetes, (poorly controlled, BSL 24 in clinic, and had been high at the time of previous surgery). History of previous AMI 6 years previously. He reports that he had a stress test following this which he “failed” but chose not to follow up. He was on cardiovascular medication afterwards, but subsequently stopped all medication, and has had no further symptoms of ischemic heart disease off all medication.

Discussion:- The surgery is for a malignancy, and there is some urgency . The patient clearly has a generally non-compliant attitude, but it is appropriate to go ahead in the relatively near future. Echocardiography was organised. Sestamibi was suggested to assess for ischemic heart disease however the patient refused to undergo this due to work concerns (i.e. a positive result may affect his employment). Endocrinology service was involved wrt to diabetes. They performed arterial blood gases to clarify that there was no ketoacidosis, and started him on perindopril, statin, diamicon and novamix 12 mornings & 14 evenings. Plan to bring patient in on the night before surgery for insulin infusion to stabilise his sugar further if necessary, and maximise compliance, and proceed to surgery.

Question:- Should aspirin be started preoperatively? Given that he was not on aspirin, it was felt appropriate to start immediately post operatively.

TOPIC 3: *Disabling Anxiety & covert sedation*

A 25 Year old female with a congenital bladder abnormality leading onto bladder stones needs cystoscopy and stone removal etc. Due to psychological issues arising from multiple anaesthetics as a child, she has a severe phobia about anaesthetics and procedural areas. She lived in another state until recently. Previously (elsewhere) this has been managed by admission to hospital the night before surgery, having a cannula inserted (needle phobia is less of an issue) and then, with her consent in advance but without her active knowledge ('behind her back'), sedation on the ward to the point of unconsciousness and then being taken to the operating theatre. Her psychiatrist supports this – as she has a “rational” understanding of her anxieties, is keen to undergo surgery, and is frustrated at her disabling anxieties, which she is working with her psychiatrist to address. In the interim, she needs surgery for her bladder condition.

Discussion:- The complexities of the case, including logistics, ethics and legalities etc were discussed at length and despite the extremely unusual suggestions from the psychiatrist, it was eventually agreed that a plan somewhat similar to this was appropriate.

TOPIC 4: *Not all Asthma is Asthma*

A 60 year old women with a history of recurrent gallstone pancreatitis and self-described “severe asthma” to the point where surgery would be extremely high risk was assessed. Her spirometry was near normal. The ‘asthma’ is due to upper airway obstruction (vocal cord dysfunction during expiration). This is diagnosed by visualisation by nasendoscopy. Anaesthesia for surgery, should not be difficult until extubation, where the dysfunction may be precipitated. CPAP may be of value.