Anaesthesia Preoperative Clinic (APOC) Audit

By

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DECLARATION

I, Dr Deshandra Dass, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Date: 13/02/2016

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Part A: Study Protocol

As approved by the Departmental Research Committee and the Human Research Ethics Committee, University of Cape Town.

Background:

Preoperative assessment clinics have been employed in many institutions to manage perioperative risks[1]. These clinics provide an opportunity to stratify
patients on the basis of risk prior to surgery, to make timely multidisciplinary referrals where appropriate, and to prescribe medical therapies according to the current best evidence resulting, in fewer last-minute cancellations for medical reasons[2] and a shorter inpatient pre-operative stay[3].

The Anaesthetic Pre-Operative Clinic (APOC-GSH) was introduced to Groote Schuur Hospital in 2009 with the aim of assessing and optimising high risk patients undergoing intermediate or high risk surgery. The vision of the clinic is to decrease perioperative morbidity and mortality, rationally and cost-consciously investigate patients, as well as to reduce theatre cancellations of inappropriately assessed and managed patients. The clinic, together with relevant role players, attempts to risk stratify patients in making an informed decision whether the intended perioperative risks are acceptable. Patients referred to the clinic fall into two categories. Either the surgical date has been scheduled and patients are referred to APOC-GSH for optimization, or the referral is for assessment of suitability to undergo an anaesthetic and thus the treatment modality hinges on the fitness for surgery.

Objective

The intention of the audit is to create a database of the patients seen at APOC-GSH during 2014.

Primary objectives are:

1 Referral pattern:

- What proportion of patients are referred for improvement of medical condition?
- What proportion of patients are referred for an assessment of operability?

2 What interventions were recommended?

- What was the influence of interventions on operability and timing of surgery?
- Does the clinic improve theatre efficiency by reducing cancellations of patients who required further interdisciplinary discussion and investigations?

Methods:

Data collection will be based on the review of APOC-GSH clerking notes and hospital patient records. The following information will be collected and entered into an Excel spread sheet: the surgical discipline referring the patient, the proposed surgery, patient co-morbidities, the lead-time from the first APOC-GSH assessment to surgery, number of visits to APOC-GSH by each patient, the investigations and additional interventions instituted at APOC-GSH. We shall also calculate the proportion of patients that would have likely been cancelled had they not attended APOC-GSH but rather been assessed by an anaesthetist the day before surgery.

The record of the APOC-GSH consultation will be documented on a clerking sheet established for use within the clinic (Addendum A). The original form will be included in the patients' file and a duplicate will be stored within the access controlled Department Of Anaesthesia offices at GSH. The duplicate records will be used to obtain the information for the audit.

Ethical approval will be sought from the UCT Human Research Ethics Committee for the establishment of the database and retrospective review of the APOC-GSH records on the understanding that patient records would be kept confidential and that the data obtained would be stored in a password protected spreadsheet. Access to the spreadsheet will be limited to the investigators involved and no identifiable patient details will be included.

Patients will be counselled as to the nature of the study and will be expected to submit signed consent forms allowing their records to be reviewed. Patients will be informed that they will not be disadvantaged by refusal to sign the consent form and that the appropriate standard of care will still be applied. No remuneration will be provided for partaking either. Consent will be documented on the consent form specifically designed for use in the APOC-GSH. (Addendum B)

Statistical analysis will be performed using an Excel® spreadsheet. Means, medians, rates and percentages will be used to describe the discrete categorical data.

Output and future work

The audit will provide an objective assessment of the population profile referred to APOC-GSH. It may guide future implementation of APOC-GSH protocol changes and assist with resource allocation depending on the surgical discipline requirements. Patient and surgeon satisfaction ratings may be embarked at a later stage juxtaposed against an adequate assessment in a cost and time conscious manner.

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Part B: Literature Review

1. Objectives

This review aims to explore the clinical utility of the APOC in enhancing perioperative clinical outcomes and its role in reducing the financial burden on healthcare providers. Furthermore, it aims to define the APOC patient population in terms of the perioperative risk profile, referral patterns and the effects of interventions initiated by the APOC.

2. Literature Search Strategy

The literature search was conducted using the UCT Health Sciences Online Library Resource. This search engine covers 17 international medical databases including MEDLINE, PubMed (National Libraries of Medicine) and EBSCOHost.

The keywords employed were: anaesthesia, preoperative, clinic, impact and outcomes in various combinations. Only full-text peer-reviewed articles were included. Further relevant articles were identified by using reference lists. Articles not published in English were excluded.

3. Summary of the Literature

3.1 Background:

Perioperative risk can be estimated by assessing clinical status, functional capacity and inherent risk of the surgery. The concept that proper preoperative evaluations could have a positive impact on the surgical experience of the patient has long been recognized.[1] The anaesthetic preoperative clinic (APOC) visit is firstly aimed at identifying and assessing the severity of medical co-morbidities that may have a perioperative effect on outcome. Once the co-morbidities are identified, modifiable risk factors are addressed to optimize the patient's condition. Finally, the clinic also serves to provide the patient, surgeon and anaesthetist the risks and thus facilitates a shared decision process with regards to the most acceptable perioperative approach.[2]

The APOC visit has become entrenched as a critical step in the perioperative process. In France, the preoperative visit is mandatory at least 2 days prior to elective surgery.[3] Recent developments in perioperative management have heightened the need for anaesthetists to no longer focus just on safety but also on cost-effective care.[4] As perioperative physicians, anaesthetists may be best placed to synchronise the various efforts made to enhance patient safety and improve outcomes via the APOC.

3.2 Benefits of APOC

3.2.1 Reduction in Surgical Case Cancellations

Traditionally, surgical patients were hospitalized prior to their operation and then seen by an anaesthetist for preoperative evaluation. The preoperative evaluation attempts to assess the perioperative risk and to optimize the general condition of the patient.[5]

Utilization of preoperative clinics yields financial benefits to the hospital.[6] Unnecessary surgical delays result in increased cost to the hospital and reduce operating room efficiency.[7]

Late surgical cancellation (on day of surgery) rates due to factors that would be preventable by use of an APOC vary greatly from >10% to 0.46% depending on how cancellations are

defined. [6,8,9,10,11]Studies that included administrative causes for cancellation e.g. lack of beds or inadequate time for surgery exhibited high cancellation rates. The rate of cancellations attributed to "medical reasons" would suggest that they were potentially preventable by patient evaluation in an APOC.[12]

Following the introduction of APOCs, cancellation rates have tended to show significant reductions in preventable cancellations due to poorly optimised chronic medical conditions. [7,13,14,15]

3.2.2 Reduction in Diagnostic Testing

Preoperative diagnostic testing should be consistent with the patient's medical history, the anticipated surgical procedure and the potential for perioperative blood loss. Tests should be ordered for specific clinical indications rather than simply because the patient is undergoing a surgical procedure.[16]

Routine preoperative testing should be avoided[17]. An unanticipated abnormal result will most likely not be clinically relevant to the anaesthetic and may lead to further unnecessary testing resulting in patient anxiety and potential surgical delay.[18,19]

Studies have consistently shown that diagnostic testing ordered via an APOC have proven to be cost-effective and have reduced rates of unnecessary testing.[20,21,22,23,24]

3.2.3 Effect on Patient Experience

There is limited information on the benefit of the APOC with regards to the patient's experience.

Anxiety is an unpleasant state which may be associated with sympathetic, parasympathetic and endocrine stimulation which can result in abnormal haemodynamic parameters.[25] Addressing anxiety and fear by providing relevant and easily understood information forms part of the preoperative evaluation. Preoperative assessment by an anaesthetist has been shown to effectively reduce the feeling of anxiety in the perioperative period.[25]

The use of patient satisfaction has been advocated as a unique clinical end point and as an indicator of the quality of the health care provided.[26,27] Personalised care, information and communication have been quoted as positive contributors to patient satisfaction.[28,26,29,14,30]

3.2.4 Reduction in length of hospital stay

The APOC has exhibited a marked contribution in reducing the length of hospital stay. This effect is mostly linked to a shorter preoperative admission varying from the day before surgery to day-of-surgery admissions.[13,31,32,21]

Consensus regarding the optimal timing of the preoperative visit has not been established therefore the quoted lead times for APOC consultations prior to surgery varies from two weeks up to four months prior to the scheduled surgery.[33,34,35]

3.2.5 Reduction in subspecialty consultations

An APOC can reduce the use of subspecialty consults without affecting patient outcome. Stringent consultation guidelines and the use of Focus Assessed Transthoracic Echocardiography (FATE)[36] can reduce the rate of cardiology consultations.[37,38]

3.3 Typical Patient Profiles in APOC's Worldwide

Ideally all patients should have a timely, thorough pre-operative assessment [39] but practically that is not possible. Most cost effective utilisation of the service would be to see the patients at highest risk of perioperative events. One of the objectives of this audit is to describe the population we encounter in the APOC and compare it to other centres. Demographic data used to describe the severity of disease of the APOC population included age, the American Society of Anaesthesiologists (ASA) Physical Status Classification and the Revised Cardiac Risk Index

Demographic information available on patients attending APOCs noted, not surprisingly, that they tended to be older (average age ranging from 57-69 years) and with no obvious gender bias.[22,9,40]

Patients were risk stratified according to their American Society of Anaesthesiologist (ASA) physical status. This classification has been criticised for low interrater reliability and not accounting for the magnitude of the surgical procedure but remains valid in correlating preoperative health status with the prediction of postoperative outcomes.[41]The majority of patients seen in APOCs worldwide fell into ASA II and ASA III categories with rates varying between centres.[12,8,27]

The use of the Revised Cardiac Risk Index (RCRI)[42] takes into account preoperative comorbid conditions and includes the nature of the surgery in the assessment of perioperative cardiac risk.[43] A single centre non-cardiac surgical population exhibited the following incidence: RCRI Grade I 63.6%, Grade II 22.2%, Grade III 9.1%, Grade IV 5.1% [40]

3.4 Typical Referral Patterns in APOC's Worldwide.

Rates of referral to APOC varies greatly between different centres and between surgical specialities. Some studies refer between 22% - 38% [40,44] and up to 85%[12] of all patients undergoing elective major surgery for APOC consultation. There is also a marked variation in referral rates between surgical specialities. Orthopaedics, general surgery, urology and vascular surgery tend to predominate[9,22,27,45] though one study showed the highest rate of referrals from ophthalmology.[40]

3.5 Clinical Outcomes of APOCs Worldwide

Complex medical problems and poor functional status coupled with the physiological stresses associated with surgery exert a multifactorial effect on perioperative patient outcomes. It seems intuitive that adequate preoperative evaluation together with a planned optimisation of chronic medical conditions will be of benefit.

An observational study looked at outcomes of patients reviewed at an APOC who were deemed "unfit for surgery". In a report from Scandinavia, patients who underwent preoperative medical optimisation prior to surgery, as recommended by the APOC, had significantly lower complication and mortality rates than those in whom the APOC recommendations were not implemented.[46]

Further advantageous morbidity and mortality findings were noted in subsets of patients undergoing major orthopaedic surgery with statistically significant reductions in the high care unit (HCU) admissions and mortality after the introduction of an APOC. A reduction in the HCU length of stay , unplanned intensive care unit (ICU) admissions and the ICU length of stay were also reported in the same study.[47] Studies have reported that patients undergoing major vascular surgery exhibited a significant reduction in mortality after the establishment of an APOC compared to similar surgery performed at the same site, prior to the APOC.[14,6]

However the role of APOC in improving patient outcome is equivocal. A population based study investigating the importance of APOC evaluation prior to major non- cardiac surgery found that prior evaluation was not associated with an improvement in survival rates[34] and a statistically significant increase in mortality related to referral for preoperative medical consultation was noted.[35] Additionally, there was also an association with a higher rate of unanticipated intraoperative complications despite correcting for comorbidities and type of surgery.[33]

A variety of confounding factors may be to blame for the poorer outcomes evidence but this illustrates the need for further large scale studies to be undertaken.[4,48]

4. Conclusion

A large and growing body of literature has investigated the role of the APOC in improving perioperative patient care. Undertaking to evaluate the functioning of the APOC-GSH at our institution using the above literature as the framework will offer insight into strengths and deficiencies in the current system. The clinical impact may strengthen efficiency and cost effectiveness while maintaining the current high standards of patient care.

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Part C: Manuscript

Title Page

Anaesthesia Preoperative Clinic (APOC) Audit

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Keywords*: preoperative clinic, pre-assessment, perioperative risk, audit, theatre efficiency*

Abstract

Background:

APOC's screen the suitability of elevated risk patients to undergo surgery, address co-morbidities, discuss risks and offer an appropriate perioperative plan. We present a descriptive audit of the patients referred to the APOC at Groote Schuur Hospital (APOC-GSH) during 2014.

Methods:

The records of all patients evaluated during 2014 (n=53) at APOC-GSH were retrospectively analysed. Ethical approval was obtained allowing patient records to be reviewed.

Results:

Of the patients seen in APOC-GSH, 62% were above the age of 60 years, 81% had an American Society of Anaesthesiologists grading ≥3 and 40% of patients had a Revised Cardiac Risk Index score of ≥ *2*. Forty five percent of patients were found to have a body mass index (BMI) > 35 $kg.m^{-2}$, of these, 67% scored ≥3 on the STOPBANG questionnaire suggesting a moderate to high risk of OSA.

The APOC-GSH found that of all patients assessed, 53% could proceed to surgery, 21% required further optimisation prior to surgery, and 18% could proceed to surgery but with a modification to the anaesthetic plan and 8% were advised to forgo surgery. Common interventions instituted by APOC-GSH were adjustment of chronic medication (26%), management of bridging anticoagulation (7.5%) and 35% required no intervention from the APOC-GSH prior to surgery. Forty five percent of APOC-GSH patients were found to have a body mass index (BMI) > 35 $kg.m^{-2}$. Of these, 67% scored ≥3 on the STOPBANG questionnaire suggesting a moderate to high risk of OSA.

Conclusion:

The study has gone a long way towards enhancing our understanding of the patient population referred to the APOC-GSH, highlighted areas for further investigation and strengthened the viewpoint that an APOC pre-assessment is an essential step in guiding the anaesthetic management for this high risk patient group.

Main Text

Background:

Preoperative anaesthetic clinics screen the suitability of elevated risk patients to undergo surgery, address co-morbidities, discuss risks and offer an appropriate perioperative plan.[1] The intention of the clinic is to avoid last minute cancellations, minimise complications and unnecessary investigations, shorten hospital stay and improve the perioperative experience for all role players at a lower cost to the funders of medical care.[2,3,4]

Furthermore, they have exhibited a marked impact in reducing patient anxiety[5] and improving patient satisfaction[6] by facilitating communication and encouraging shared decision-making, allowing patients to partake in the formulation of their own perioperative plan.

The Anaesthetic Pre-operative Clinic (APOC-GSH) at Groote Schuur Hospital is a consultant-driven clinic held weekly. Patients scheduled for elective surgery are telephonically referred by the surgeon responsible if they are thought to be at an elevated risk of perioperative complications. To maximise the suitability of referral, all patients are screened by the APOC-GSH consultant based on information regarding risk factors provided by the surgeon. The screening questionnaire ascertains the presence or history of ischaemic heart disease, cardiac failure, cerebrovascular disease, diabetes mellitus, renal impairment and the nature of the surgery to be undertaken. Patients with three or more risk factors and co-morbidities become eligible for review at APOC-GSH. Basic special investigations are guided by the telephonic consultation with the APOC-GSH anaesthetist to avoid unnecessary investigations by the surgical team prior to the patient's visit. At the APOC-GSH, patients are evaluated, optimised and counselled with regards to their risk status. If necessary, further investigations or referral for specialist opinion are ordered from the APOC-GSH. Feedback is provided to the patient, their families and the surgeon with regards to a final decision on the suitability of the patient for the surgery.

We present a descriptive audit of the patients referred to the Anaesthetic Pre-operative Clinic (APOC-GSH) at Groote Schuur Hospital during 2014.

Methods:

All patients evaluated during 2014 at the APOC-GSH were recruited. The 2014 calendar year was chosen as it marked the commencement of a standardised clerking sheet incorporating the findings of an anaesthetist performed screening cardiac ultrasound. The original form was included in the patients' file and a duplicate stored in an access controlled office within the hospital. The duplicate records were used to obtain the information for the audit.

Ethical approval was obtained from the UCT Human Research Ethics Committee (HREC REF: 405/2013) for the establishment of the clinic database and for review of the patient records. Patient confidentiality was maintained by storing the records in an access controlled office and no identifiable patient information was recorded or distributed. The data was collected on an Excel Spreadsheet which was password protected.

Informed consent was obtained from patients at the time of the first consultation, allowing their records to be reviewed for future study purposes. The informed consent received was documented on a written record and stored in the patient folder. Patients were informed that they would not be disadvantaged by refusal to sign the consent form and that the appropriate standard of care would still be applied. No remuneration was provided for partaking either.

The records of all 53 patients seen in the APOC-GSH during 2014 were retrospectively analysed. No patients were excluded from the study. Various parameters related to the demographics, patient risk profile and interventions performed were documented. Data pertaining to the patient risk profile included self-assessment of functional capacity by means of the Dukes Activity Status Index (DASI)[7], objective measurement of functional status by use of the Six-Minute Walk Test (6MWT)[8], the estimation of the perioperative risk of major adverse cardiac events by use of the Revised Cardiac Risk Index (RCRI)[9,10] and the American Society of Anaesthesiologists (ASA) Physical Status grading.

Statistical analysis was performed using an Excel® spreadsheet. Means, medians, rates and percentages were used to describe the discrete categorical data.

Results:

The median age of patients referred was 61 years with 62% above the age of 60. (Table 1.) The most commonly referring surgical specialities to the APOC-GSH were General Surgery (18/53; 34%) and Orthopaedics (15/53; 28%) followed by Gynaecology (11/53; 21%), Urology (5/53; 9%), Neurosurgery (2/53; 4%), Otorhinolaryngology (1/53; 2%) and Vascular Surgery (1/53; 2%) (Figure 1). Of the patients referred, 16/53 (30%) had a scheduled date of surgery with the average lead time from date of first consultation in APOC-GSH to surgical date of 40.1 days (Range: 11- 89 days). The other 70% (37/53) of patients were referred for assessment of their fitness to undergo surgery and their booking for surgery hinged on the findings at APOC-GSH.

Table 1: Descriptive data of APOC-GSH patient profile

Age	Mean: 63.3 (Range 30-87)
Sex	Male: 22/53 (42%), Female: 31/53 (58%)
American Society of Anaesthetists (ASA) Physical Status Grade	
ASA 2	10/53 (19%)
ASA 3	38/53 (72%)
ASA 4	5/53 (9%)
Revised Cardiac Risk Index (RCRI)	
RCRI 2	12/53 (23%)
RCRI 3	7/53 (13%)
RCRI4	2/53 (4%)
6 Minute Walk Test Performance (6MWT)	
≥350 metres	26/41 (62%)
<350 metres	16/42 (38%)
Obstructive Sleep Apnoea (OSA) Risk	
STOPBANG Score ≥ 3	24/53 (45%)
STOPBANG Score < 3	29/53 (55%)

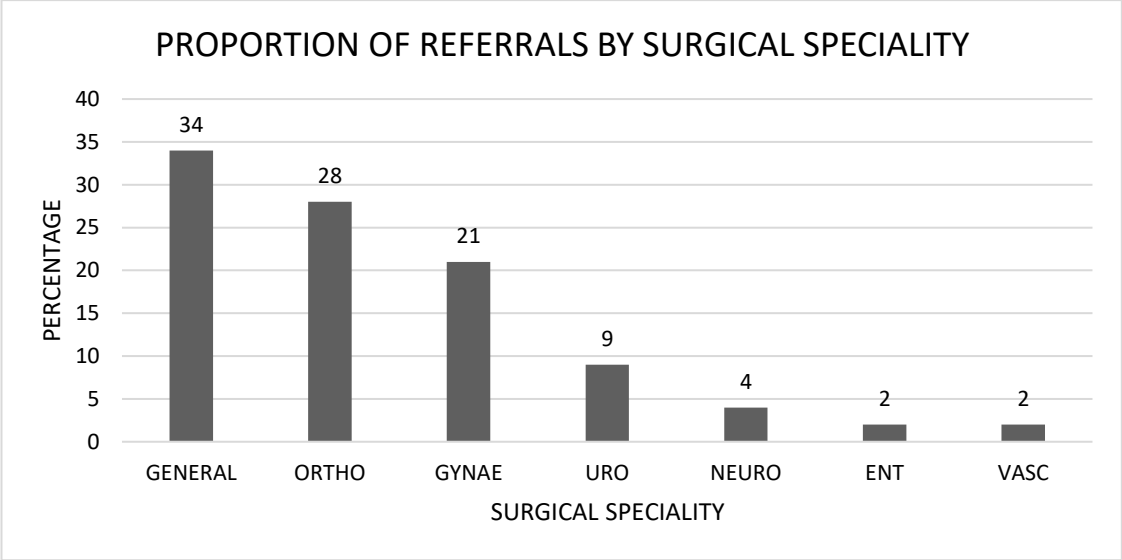

Figure 1: Distribution of Referrals by Surgical Speciality

The findings of the APOC-GSH after assessment were that 53% (28/53) of patients could proceed to surgery without delay. Twenty-one percent (21%; 11/53) required further optimisation prior to surgery, 18% (10/53) could undergo surgery but required a modification of the anaesthetic management (recommendations made by APOC-GSH e.g. use of regional techniques, invasive monitors or placement in ICU/HCU etc.) and 8% (4/53) were advised to forgo surgery in light of an unfavourable risk/benefit ratio (Figure 2).

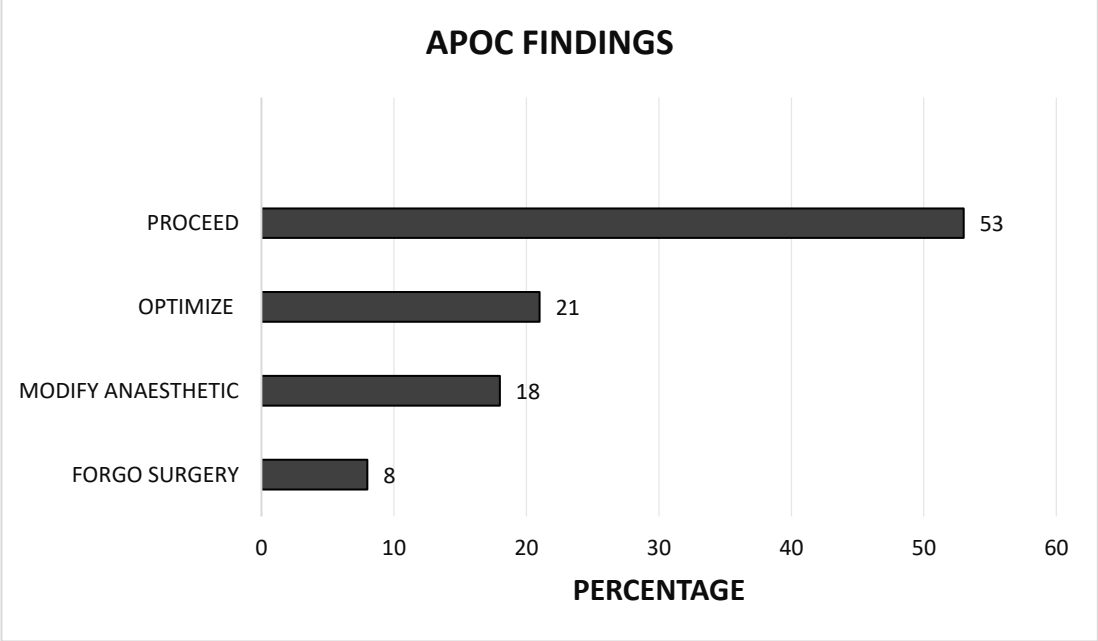

Figure 2: Proposed plan following APOC-GSH Assessment

The most common intervention instituted by the APOC-GSH was adjustment of chronic medication (14/53; 26.4%). Planning and optimisation of bridging anticoagulation occurred in 4/53 (7.5%) of patients. Additional testing was limited to 4/53 requiring exercise or pharmacological stress testing, 4/53 patients required pulmonary function testing and 1 patient required formal echocardiography. A total of 10/53 patients required sub-speciality referrals from APOC-GSH which included 6 patients to cardiology, 2 to physiotherapy and one each to pulmonology and general medicine. The rate of cardiology referrals appears to be lower than suggested by the literature and may be due to the ongoing training in bedside echocardiography carried out at our institution and the availability of echo certified consultants within APOC-GSH. This may not be applicable to other centres within South Africa. Only 4 patients required a second follow-up consultation at APOC-GSH

An American Society of Anaesthetists (ASA) grading of >2 was noted in 81% of patients. Lee's RCRI was used to stratify the risk of cardiac events in patients being considered for non-cardiac surgery. The risk of adverse cardiac events increases as the number of risk factors increases. Forty percent (21/53) of the patients seen had 2 or more cardiac risk factors. (Figure 3)

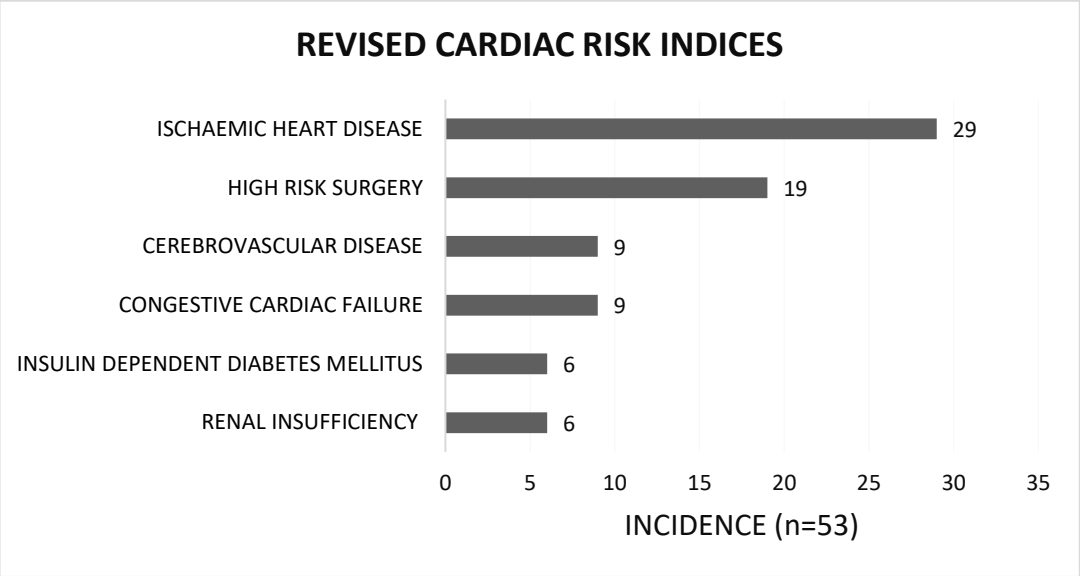

Figure 3: Incidence of Cardiac Risk Factors as per RCRI

A poor functional capacity defined as achieving <4 metabolic equivalents (METS) was subjectively determined on history in 30% (16/53) of patients using the Duke's Activity Status assessment. Objective assessment using the six minute walk test (6MWT) was performed in 79% (42/53) of patients. Seven patients were unable to perform the test due to pre-existing physical disability or due to joint dysfunction related to the presenting orthopaedic complaint whilst 4 patients had undocumented 6MWT distances with no explanatory reason provided. The results of the 6MWT showed that 16/42 (38%) of patients managed a 6MWT distance less than 350 metres with the other 62% managing >350m.

Forty five percent (24/53) of APOC-GSH patients were found to have a body mass index (BMI) > 35 $kg.m^{-2}$. Obesity is one of the risk factors for obstructive sleep apnoea (OSA). The STOPBANG questionnaire revealed that 67% (16/24) morbidly obese patients scored 3 or more on STOPBANG questionnaire (4 undocumented, 4 scored < 3. In contrast, 28% (8/29) patients with a BMI < 35 $kg.m^{-2}$ were found to have an elevated risk of OSA (≥ 3 STOPBANG score). Overall, 45% (24/53) of patients scored ≥ 3 on the STOPBANG) suggesting a moderate to high risk of OSA.

Discussion:

There is a consensus among researchers that the APOC-GSH has numerous benefits for the various stakeholders involved in the healthcare process.[1,3,11]This audit set out firstly to describe the patient population referred to the APOC-GSH and secondly to document the interventions and recommendations related to the patient considered for the proposed surgery.

The patient profile described in our audit suggests that they share a similar risk profile as other APOC's in various regions of the world.[3,12] Elderly patients with multiple risk factors for cardiorespiratory disease and chronic co-morbidities that have been inadequately managed represent a particularly high risk anaesthetic population. Timely intervention by means of optimal medical management and sufficient time for interventions to have an effect may improve the risk/benefit ratio, allowing previously "unfit" patients to undergo major surgery with a reduced incidence of perioperative complications. Having these interventions implemented well before the date of surgery should reduce cancellation of cases on the day of surgery, resulting in greater theatre efficiency.[3,13,14] Referral to the APOC with an adequate lead time before surgery will allow investigations and interventions to be performed and analysed without the need for lengthy preoperative admissions potentially allowing even high risk patients for major procedures to be admitted on the morning of surgery.

Whilst there is currently no consensus as to the optimal timing of the preoperative visit, the average lead time before surgery of 40 days suggests that this would be adequate for perioperative optimisation and investigation but the risk of deterioration of pre-existing chronic medical problems and potential worsening of the surgical condition is a significant concern. A shorter lead time may not allow an adequate period for all investigations to be performed on an outpatient basis and if the APOC-GSH determines that the patient is unfit for surgery, there may not be sufficient time to find an alternative patient to fit the surgical slot.

The subgroup of patients referred for an assessment of their fitness to undergo surgery represents the majority (70%) of referrals. The time-independent nature of the referrals allows for complete evaluation of the issues, appropriate investigation to be carried out and follow-up visits to assess the effects of intervention. Those who are deemed unfit for surgery will not be unnecessarily booked for procedures thus ensuring efficient utilisation of available theatre time, focussing on the patients with a more favourable risk profile.

Compared to trends described in international clinics, there is a surprising dearth of referrals from vascular surgery. Vascular surgical patients tend to have a number of risk factors and comorbidities and undergo major procedures. As a result, this group of patients tends to be regarded as particularly high risk. However, we report only a single vascular patient being referred to the APOC-GSH, far fewer than suggested by trends worldwide. A likely reason may be due to the late presentation of patients with chronic vascular disease that develop acute complications. Consequentially, the urgent nature of surgery may preclude preoperative evaluation except on the day of surgery as an emergency consultation. Further investigation to determine possible reasons is required to ensure that the benefits of timeous preoperative evaluation are available to all high risk patients.

The most common intervention performed was the adjustment of chronic medication. Optimal medical management of risk factors and chronic diseases can improve ASA status, functional capacity and reduce the risk of complications.[15,16] These changes often require time to exert their benefits and therefore the APOC is well placed to implement these changes to the advantage of the patient. A poorly controlled chronic condition e.g. hypertension or asthma may lead to last minute cancellation or increase the risk of perioperative complication. Similarly, the use of bridging anticoagulation aims to balance

the potentially catastrophic thrombotic risk against the risk of intra- and postoperative bleeding. A rational plan on management of perioperative anticoagulation can be coordinated on an outpatient basis by the APOC, thus limiting the need for early admission and unnecessary testing.

Despite the presence of guidelines on appropriate preoperative testing, a number of unnecessary tests are still performed as standard screening investigations.[17,18,19] The APOC can limit unnecessary tests by only ordering them in patients where the results would affect the management.

The most common subspecialty consultations obtained were with cardiology. Cardiology consultations were obtained to help optimize the management of patients with relatively complex cardiac comorbidities. This is a trend noted in most APOC's worldwide. With the introduction of point of care ultrasound, focused assessment using transthoracic echo (FATE®), only one of the referrals was purely for echocardiographic imaging of the heart. Referrals to a physiotherapist were for assistance in optimising patients with severe respiratory illness.

A concerning feature was the high proportion of patients referred who did not require any further intervention, investigation or consultation from the APOC-GSH and could thus proceed to surgery. This begs the question of whether there was any need to have the additional evaluation done at the APOC-GSH or if the routine preoperative visit by the anaesthetist responsible for the list, done on the day before surgery, would have sufficed. Despite having an elevated risk profile, many of the chronic conditions may be adequately managed with no room for meaningful optimisation. The challenge is to screen those patients without necessarily seeing them in the APOC-GSH. Open lines of communication with surgeons and the establishment of institutional guidelines on APOC referral is needed for optimal patient selection. However it could also be argued that those patients who did require APOC intervention may have been cancelled had they only been seen on the day of or day before surgery.

The use of the ASA, RCRI and 6MWT provides objective measures of the patient's cardiopulmonary health status and quantifies the risk of perioperative cardiac complications. Subsequently (from 2015), and in addition to using the above, the APOC-GSH has started using the American College of Surgeons National Surgical Quality Improvement Program Surgical Risk Calculator (ACS NSQIP) as a risk assessment tool. Although not validated in the South African context it does provide a starting point for the risk discussion with the patient and surgeon.

Regarding functional capacity assessment, most patients (79%) performed the 6MWT. . In patients who are not able to perform the test or who have limited ability to exercise (<350m), the dipyridamole stress test may be requested. The test is requested in those patients believed to have limited functional capacity due to myocardial ischaemia and generally only ordered if it is felt that a coronary intervention may be necessary prior to elective surgery. It thus becomes important to have close discussions with a cardiologist. Cardio-pulmonary exercise testing (CPET) on a cycle ergometer is a service offered by the pulmonary physicians but like the stress test relies on additional visits to the hospital. It does allow us to discriminate between cardiac and respiratory limitation of exercise but unfortunately it is not possible to perform in all patients, particularly those with very high body mass index or large joint disease. Therefore our current assessment of functional capacity is predominantly based on history, examination and the 6MWT. Going forward, in the subset of patients who are not capable of performing the 6MWT, the APOC-GSH may consider utilising a validated frailty scoring system based on historical findings (exhaustion, weight loss and low physical activity)[20] and simple tests (weakness using hand ergometer, slowed walking, timed up-and go test)[21,22] all of which can be easily performed at the time of first consultation.

Obesity is a risk factor for postoperative respiratory and cardiovascular complications.[23] The rising incidence of obesity in South Africa is reflected in our APOC-GSH population. The multisystem involvement associated with obesity requires an exhaustive preoperative assessment to exclude target organ involvement and metabolic abnormalities. The association between obesity and the development of OSA is well documented. The use of the STOPBANG questionnaire has been validated as a screening tool to identify patients at elevated risk of having OSA.[24] Limited availability of polysomnography means that very few suspected OSA patients are formally diagnosed. As a result, a modification of anaesthetic technique and placement in a high dependency unit are undertaken based on the STOPBANG score. In our population, almost 2/3 of morbidly obese patients were classed as moderate to high risk of having OSA. The APOC-GSH is ideally positioned to facilitate the availability of high dependency beds by early identification of these patients, allowing time for planning of an admission.

Limitations of our study include the analysis of retrospective data over a short (1 year) epoch. A further limitation is that we have no outcomes data to make any comments on the impact of the anaesthetic pre-operative clinic but this audit was the first step in defining the APOC-GSH population with the future view of assessing the clinic's impact at our institution.

Conclusion:

There is a growing volume of literature promoting the benefits of the APOC in facilitating appropriate investigations and optimisation strategies in the preoperative period with the aim of a reduction in surgical cancellation rates, anaesthetic-related complications, and length of hospital stay and overall cost of care in high-risk patients.

Our findings outline the particular risk profile of patients referred to APOC-GSH. They are characterised by an elevated disease burden and risk of perioperative cardiorespiratory adverse events. The study documented that patients are seen on average 40 days before surgery, allowing for timely intervention and recommending that 53% proceed as scheduled. The study also identified that 8% of the patients were identified as too high a risk to proceed with surgery. Importance of this may be two fold, firstly by avoiding a cancellation on the day of surgery, theatre efficiency may be improved and secondly, the patient may be directed onto a non-surgical therapeutic or palliative course earlier in their disease process.

While our audit did not provide data on the perioperative outcomes, it has served to highlight the need for a formal mechanism to monitor morbidity and mortality.

The study has gone a long way towards enhancing our understanding of the patient population referred to the APOC-GSH, highlighted areas for further investigation and strengthened the viewpoint that an APOC pre-assessment is an essential step in directing anaesthetic management for this high risk patient group.

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Part D: Supporting Documents

Ethics Approval Letter

UNIVERSITY OF CAPE TOWN

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Faculty of Health Sciences Human Research Ethics Committee
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www.health.uct.ac.za/research/humanethics/forms

09 July 2013

HREC REF: 405/2013

Dr M Nejthardt
Anaesthesia
D-23
NGSH

Dear Dr Nejthardt

PROJECT TITLE: ANAESTHETIC PRE-OPERATIVE CLINIC (APOC) AUDIT

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee for review.

It is a pleasure to inform you that the HREC has **formally approved** the above mentioned study.

Approval is granted for one year till the 15 July 2014.

Please submit a progress form, using the standardised Annual Report Form, if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please quote the REC. REF in all your correspondence.

Yours sincerely

Signed

PROFESSOR M BLOCKMAN
CHAIRPERSON, HSF HUMAN ETHICS

Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA),

«Article»

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

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19 January 2016

HREC REF: 405/2013

Dr M Nejthardt
Department of Anaesthesia
D23
GSH

Dear Dr Nejhardt

PROJECT TITLE: Anaesthetic Preoperative Clinic Audit

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

The HREC acknowledges that MMed Candidate, Dr Deshaan Dass is also involved in this study.

Please quote the HREC REF in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Yours sincerely

PROFESSOR M/BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE

Patient Consent Form

Department of Anaesthetics
Groote Schuur Hospital,
Anzio Road,
Observatory 7925.
HREC reference nr:R029/2013

Patient Sticker

CONSENT FORM

Anaesthetic Preoperative Clinic (APOC) Registry

Please initial box

I confirm that I have received information about the purpose and use of the APOC data register. I consent ☐ to the use of my data with other medical practitioners if/when required so as to assist the APOC clinician in advising on an appropriate peri-operative plan. I also acknowledge that my data may be used in future research and/or audits to improve medical care and that every reasonable effort shall be taken to protect my privacy and confidentiality

_____	_____	_____
Name of Patient	Date	Signature

_____	_____	_____
Name of Person taking consent	Date	Signature

_____

Anaesthetic Pre-operative Clinic
Marcin Nejthardt – Consultant Anaesthetist, MB.Nejthardt@uct.ac.za
Francois Roodt - Consultant Anaesthetist, f.roodt@uct.ac.za

Should you have any enquiries please contact us at 021 404 5001, D23 Groote Schuur Hospital or via Groote Schuur Hospital switchboard.

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References

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The following are sample references:

1. Jun BC, Song SW, Park CS, Lee DH, Cho KJ, Cho JH. The analysis of maxillary sinus aeration according to aging process: volume assessment by 3-dimensional

reconstruction by high-resolutional CT scanning. Otolaryngol Head Neck Surg. 2005 Mar;132(3):429-34.

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