

OVERVIEW OF PREOPERATIVE CARDIOLOGY CONSULTATION AT A TERTIARY CARE CENTRE

Thapa S¹, Basnet M²

¹Department of Internal Medicine, Nepal Medical College and Teaching Hospital, Attarkhel Gokarneshwor-8,

²Department of Cardiothoracic and Vascular Anesthesiology, Maharajgunj Medical college, Institute of Medicine, Kathmandu, Nepal

ABSTRACT

Preoperative cardiac consultations are regularly performed during pre-anaesthetic checkup. However, the efficiency and usefulness of these consultations are unclear. The objective of this study is to assess the indication and usefulness of preoperative cardiac consultation. In this cross-sectional study, 100 patients sent for preoperative cardiac consultation were evaluated. Baseline characteristics, Revised Cardiac Risk Index (RCRI), comorbidities were recorded. The motive for referral and outcome of the consultation were evaluated. Evaluated patients consist of male (45%) and female (55%) with age ranging from 18 to 89 years (average 51.28 ± 14.6 years). Most common comorbidities were hypertension (53%) and diabetes (30%). High proportion (49%) of patients were sent for cardiac consultation with suspicion of abnormal ECG. Most of the patient had RCRI of 0 and 1 (45% and 28% respectively), while 14% and 13% had RCRI of 2 and 3 respectively. "Clearance for surgery" was the most common reason for consultation (60%) followed by risk stratification (41%) and optimization of cardiac disease (40%). Twenty four percent of patients were sent with suspicion of cardiac comorbidity. Twenty six percent were sent without any specific cause. Only 27% of the patient had increased risk of major adverse cardiac events. Further management was not needed in 58% patients. Only 12% patients had a new diagnosis. Preoperative cardiac consultation can be useful in detecting newer cardiac comorbidities and optimization in some patients. However, most preoperative cardiac consultation does not alter the perioperative management.

KEYWORDS

Consultation and referral,
preoperative care, cardiology service

CORRESPONDING AUTHOR

Dr. Sushma Thapa, Lecturer,
Department of Internal Medicine,
Nepal Medical College Teaching Hospital,
Attarkhel, Gokarneshwor-8, Kathmandu, Nepal
Email: sushmathapanmc@gmail.com
ORCID ID: 0000-0002-7671-059X
DOI: <https://doi.org/10.3126/nmcj.v21i3.26443>

INTRODUCTION

Preoperative cardiac consultations are regularly performed during pre-anaesthetic checkup.¹ However, the efficiency and usefulness of these consultations are unclear.² It might be helpful if it modifies the outcome. Further information revealed during the consultation leads to a different management regime/interventions leading to better outcome of the patient. Stratification of risk leads to better informed doctors and patient parties regarding risk of Major Adverse Cardiac Events (MACE) such as Myocardial infarction or life-threatening arrhythmias, which may help for better patient management and outcome.³ Finally perioperative period is also a time for diagnosis of many chronic diseases which may have longterm impact after surgery.

However, if an unwarranted consultation is done, it may lead to unwanted hassles. Futile investigations, delay in surgery and even absconding may ensue. Consequently such consultation results in unproductive use of manpower, hospital resources and unnecessary expenses. Patients will be subjected to emotional and physical trouble leading to dissatisfaction.⁴ The objective of this study is to assess the indication and usefulness of preoperative cardiac consultation.

MATERIALS AND METHODS

This cross sectional study was conducted in the Cardiology Department of a tertiary care teaching hospital of Nepal. Ethical approval was taken from Institutional Review Committee (IRC) of the hospital and written consents from the patients were obtained. One hundred consecutive patients sent for preoperative cardiac consultation were evaluated. Sample size was calculated using the formula by Daniel *et al.*⁵ Consultations for patients not planned for surgical intervention were not included. Data of all patients who were referred for preoperative cardiac evaluation were recorded in a preformed data sheet. Baseline characteristics were obtained and the Revised Cardiac Risk Index (RCRI) was calculated. Co-morbid conditions were recorded.

Revised Cardiac Risk Index (RCRI)⁸ is a tool for predicting a patient's risk of perioperative cardiac complications. The RCRI calculates cardiac risk by looking at preoperative variables, history of Ischemic Heart Disease (IHD), Congestive Cardiac Failure (CCF), Diabetes Mellitus (DM) requiring insulin, creatinine (Cr)>2 mg/dl and type of surgery. The cardiac risk according to number of predictors can easily be estimated (0

predictors = 0.4%, 1 predictor = 0.9%, 2 predictors = 6.6%, ≥3 predictors = >11%).

The main reason for referral was noted and classified into different categories. If more than one motive was present each motive was counted individually. If no reason was mentioned then it was classified as unspecified. The result of preoperative cardiac consultation was also noted and classified. If more than one outcome was present each outcome was counted individually. If no change in patients' diagnosis, medication and if patient had no high risk requiring peri-operative consultation then it was counted as 'No further management'. Patients were stratified as high risk as per American College of Cardiology /American Heart Association (ACC/AHA) guidelines.

The primary data were collected in a master sheet made in Libre Office Calc 6.0. Data were processed and analyzed manually and in Libre Office Calc 6.0. Nominal data were shown in frequency and percentage while Continuous data were shown in mean $\pm$ SD.

RESULTS

One hundred patients sent for preoperative cardiac consultation were assessed. Of the patients 45% were male and 55% were female. Age of the patients ranged from 18 years to 89 years, although most patients were above 40 years (77%). The average age being 51.28 ± 14.6 years. The cases included surgical cases (42%), gynecological and obstetric cases (29%), orthopedic cases (26%) and others (3%).

Table 1: Comorbidities present in the patients visiting for preoperative cardiac consultation

Comorbidity	Incidence %
Hypertension	53
Chronic Obstructive Pulmonary Disease	8
Ischemic Heart Disease	9
Congestive Heart Failure	10
Valvular heart disease	10
Stroke	3
DM	30
Renal failure (Cr>2 mg/dl)	9
Abnormal ECG suspected	49

As expected the most common comorbidities were hypertension and diabetes. However, most of them were optimally managed with medication. Other comorbidities are as listed in Table 1. High proportions (49%) of patients were

sent for cardiac consultation because of suspicion of abnormal ECG.

Most of the patient had RCRI of 0 and 1 (45% and 28% respectively), 14% had RCRI of 2 and 13% had RCRI of 3 while no patient had RCRI of 4 or more.

Table 2: Motive for preoperative cardiac consultation

Motive	Incidence %
To R/O diagnosed cardiac condition	24
Access / stratify operative risk	41
For optimization of previous cardiac morbidity / medication	40
Clearance for surgery	60
Unspecified	26

R/O: Rule out

Most of the patient had more than one reason to seek cardiac consultation (Table 2). "Clearance for surgery" is the most common reason for consultation (60%). Forty one percent were sent to access perioperative risk of major adverse cardiac events (MACE). While 40% were sent for optimization. These include changes in antihypertensive medication, antiplatelet drugs, anticoagulants and diabetes drugs. Twenty four percent of patients were sent with suspicion of cardiac comorbidity. Interestingly 26% were sent without listing any specific cause.

The outcomes of the consultation are listed in Table 3.

Table 3: Outcome of preoperative cardiac consultation

Outcome	Incidence %
New diagnosis	12
Addition/change in medication	39
Non-interventional investigation	63
Interventional investigation	9
No increased risk of MACE	73
No further management	58

Only 12% of patients had one or more new diagnosis. These included patients sent to rule out new cardiac condition as well as those for other reasons. New diagnosis included essential hypertension (n=8), hypothyroidism (n=3), arrhythmia (Atrial fibrillation, bundle branch block) (n=4) and ischemic heart disease (n=2). Non-interventional investigations were needed in 63% of the patients. Most of these included trans-thoracic echocardiography (56 patients).

Other test included repeat ECGs, treadmill test (TMTs), Holter and Ambulatory 24hr BP. In 9% of the cases, patients were advised for Interventional test which included Coronary angiogram, Dobutamine stress test, CT angiogram. Only 27% of the patients had increased risk of major MACE, 73% of patients had no increase in MACE. Fifty eight percent of patients had no further management from cardiac consultation. Management of patient mostly included change or addition of new drugs and follow up required in post operative period. Few (6%) patient had postponement of the elective surgery for brief period of time. Only one patient was referred to cardiac center for management of cardiac lesion and alteration of surgical plan.

DISCUSSION

We evaluated 100 preoperative cases sent for cardiac consultation. These included both male and female, mostly above the age of 40 years, from all surgical specialties.

Patients with various chronic disease present for cardiac consultation. A significant number of patients had hypertension. Hypertension could have easily been diagnosed without the need of a cardiologist. Moreover, most were already managed with anti-hypertensive. Literature has consistently suggested that even uncontrolled blood pressure less than 180/110 is not a high risk for perioperative MACE. A more rational approach is to test for end-organ damage.⁶

Another condition that resulted in high number of cardiac evaluation was due to suspected abnormal ECG (49%). Most did not result in any new diagnosis requiring treatment. It confirms the conclusion of studies that the incidental finding of an abnormal preoperative ECG rarely lead to further management.⁷ A better competency in ECG interpretation could have resulted in lesser number of consultations for these changes.

However, not all consultations were in vain as some resulted in diagnosis of rhythm disorder treatable with medication. IHD and hypothyroidism were also diagnosed because of the abnormality detected in ECGs.

Other comorbidities in patients presenting for evaluation included DM (30%), valvular heart disease (10%), CCF (10%), renal failure (9%) and stroke (3%). All these ailments are known predicting factors for perioperative cardiac events.⁸

The present study calculated that majority of the patients had RCRI of 0 and 1 (73%). This simple calculation is quite accurate and easy. A major

portion of cardiac evaluation to stratify risk may have been unnecessary if it had been used and decreased the number of consultation. However, cardiac consultation may also have been done for purpose other than risk stratification and reduction such as for confirming new diagnoses and optimization of medications.

A high number of cases were sent for clearance for surgery. The term "clearance for surgery" is dubious for cardiologists as well as for primary surgeons and anaesthesiologists. Even the healthiest of the patients have some degree of risk of MACE. For example American Society of Anesthesiologist Physical Status (ASAPS) I has 0.1% of cardiac complication,⁹ and RCRI of 0 has 0.5% of MACE.¹⁰ The treating doctors are still responsible for management and counseling of any complication during perioperative period. A Cardiologist at best can only access the patient and estimate the risk of MACE, which can easily be done by simple bedside tools like RCRI or a sophisticated online calculator (euroscore).¹¹ Treating surgeons and anaesthesiologist are primarily responsible for the optimum management of their patient and should be the one to acknowledge the risk and counsel regarding it to the patient.

Although 24% of the consultations were done with suspicion of some cardiac condition, only 12% of all the patients (suspected and unsuspected) had 1 or more new diagnosis. This is similar to the findings of the study done by Kleinmann¹² where 15% of their study subjects had a new diagnosis. In our study, these include essential hypertension, hypothyroidism, atrial fibrillation, valvular heart disease and ischemic heart disease. Most of these could have been diagnosed without the help of a cardiologist. However, we have to acknowledge that the perioperative period is the time for diagnosis of many chronic diseases. Thus encouragement is necessary for any effort that might result in early diagnosis and management of these chronic diseases which would have been detected decades later in more advanced stages.

A large proportion (26%) of consultations was sent without any specific reason. Most of these consultations will not only lead to delay in management of their disease but may also be subjected to unjustified tests and emotional stress.⁴ A thorough examination by the treating physician would have resulted in better understanding of the patients' condition, assisted in perioperative management as well as help in strengthening rapport with the patient.

Regarding the outcome of perioperative cardiac consultation, a high number of cases (42%) had no further management from the cardiologist. Even those needing further management were

for drug dose adjustment. Only 6% patient had to postpone the surgery for optimizing the patients' condition, and one case was canceled for percutaneous intervention. A high number of patients had non-interventional testing (mostly trans-thoracic echocardiography). This is due to easy availability, prompt accessibility and acceptance of echocardiography for ascertaining the functional and structural status of the heart by both doctors and patients. Very few patients needed interventional study.

As in other studies,¹³⁻¹⁵ most of the patients (73%) had no increased risk of MACE (RCRI ≤ 1). Outcomes of preoperative cardiac consultations suggest that doctors are inclined to performing non-interventional tests. Although new diagnosis and need for further management are limited and most of the patients are not at high risk of MACE. Observations of the study findings suggest that there are still areas for more efficient consultations. Better training regarding interpretation of ECGs and echocardiogram report can decrease the need of consultation. Confirming the need for consultation by enlisting the specific cause can lead to clarity of the need for consultation and focus the cardiologist regarding the necessities thus saving vital time and money. Lastly following an algorithm such as those provided by ACC/AHA lead to more efficient and prompt service.¹⁶

In conclusion, preoperative cardiac consultation can be an important period of detecting newer cardiac comorbidities and optimization of cardiac disease and regular medication in some patients. In spite of this, most preoperative cardiac consultation does not alter the perioperative management but may result in delay. A more systematic consideration of the potential benefits of preoperative cardiac consultation is needed.

ACKNOWLEDGEMENTS

We would like to thank Prof. Dr. Sanjib Dhungel for providing the participants of the study and Prof. Dr. Bishwas Pradhan and Dr. Srijana Pradhananga for their inputs in manuscript preparation.

REFERENCES

1. Haynes AB, Weiser TG, Berry WR *et al.* A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med* 2009; 360: 491-9.
2. Karim HMR. Is majority of requests by anesthesiologists for cardiologist consultation unjustified? *Anaesth Pain Intensive Care* 2016; 20 : S109-14.

3. Zambouri A. Preoperative evaluation and preparation for anesthesia and surgery. *Hippokratia* 2007; 11: 13–21.
4. Feely MA, Collins CS, Daniels PR, Kebede EB, Jatoi A, Mauck KF. Preoperative Testing Before Noncardiac Surgery: Guidelines and Recommendations. *Am Fam Physician* 2013; 87: 414–8.
5. Daniel WW. Biostatistics: A Foundation for Analysis in the Health Sciences. 7th ed. New York: John Wiley & Sons; 1999.
6. Palmer J. Hypertension and perioperative risk. *Brit J Anaesth* 2004; 93: 305, <https://doi.org/10.1093/bja/aei592>.
7. Fleisher LA. The preoperative electrocardiogram: what is the role in 2007? *Ann Surg* 2007; 246: 171–2.
8. Detsky AS, Abrams HB, Forbath N *et al*. Cardiac assessment of patients undergoing noncardiac surgery. A multifactorial clinical risk index. *Arch Intern Med* 1986; 146: 2131–4.
9. Wolters U, Wolf T, Stützer H, Schröder T. ASA classification and perioperative variables as predictors of postoperative outcome. *Brit J Anaesth* 1996; 77: 217–22.
10. Lee TH, Marcantonio ER, Mangione CM *et al*. Derivation and prospective validation of a simple index for prediction of cardiac risk of major noncardiac surgery. *Circulation* 1999; 100: 1043–9.
11. <http://www.euroscore.org/calc.html>
12. Kleinman B, Czinn E, Shah K, Sobotka PA, Rao TK. The value to the anesthesia-surgical care team of the preoperative cardiac consultation. *J Cardiothorac Anesth* 1989; 3: 682–7.
13. Katz RI, Barnhart JM, Ho G *et al*. A survey on the intended purposes and perceived utility of preoperative cardiology consultations. *Anesth Analg* 1998; 87: 830–6.
14. Minai FN, Kamal RS. Evaluation of cardiology consultations sought from the anaesthesia clinic. *J Coll Physicians Surg Pak* 2004; 14: 199–201.
15. Aslanger E, Altun I, Guz G, *et al*. The preoperative cardiology consultation: goal settings and great expectations. *Acta Cardiol* 2011; 66: 447–52.
16. Fleisher, LA, Fleischmann KE, Auerbach AD, *et al*. 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Non cardiac Surgery. *J Am Coll Cardiol* 2014; 64: e77–e137.