

Pre-Operative Assessment of the Cardiac Patient

Overview

Approach the Cardiac patient in a similar vein to any other thorough pre-operative anaesthetic assessment for a 'big case'.

This assessment must include past medical history as there are often significant co-morbidities as well as a focussed examination, all with an emphasis on Cardiac, Respiratory and Renal systems (see Figure 1). A current medication history and most recent investigations are essential, followed by a discussion about the nature of anaesthesia and the journey through ICU as discussed later.

Whilst many of these problems, investigations and treatments will have been addressed prior to the evening of surgery, there will be a risk-benefit profile in delaying an operation for a given issue. Discussion with a Consultant Cardiac Anaesthetist is mandatory.

System	Enquiry	Investigations	Top Tips
Cardiac	<p>Exercise tolerance</p> <p>History of failure symptoms, including orthopnoea</p> <p>History of angina or cardiac events</p>	<p>Angiogram</p> <p>Trans-thoracic or trans-oesophageal echo</p> <p>ECG – look for LVH and rhythm</p>	<p>Angiogram – Left anterior descending, triple vessel and left main stem disease are high risk (Barnard, et al., 2010)</p> <p>TTE – Ejection fraction >50% is low risk, <50% is moderate and <25% is high risk. Presence of reduced ejection fraction but associated mitral regurgitation means the ventricle is severely impaired. Look for pulmonary hypertension</p>
Respiratory	<p>History or symptoms of chronic lung disease</p> <p>Smoking history</p>	<p>Pulmonary function test (PFT)</p>	<p>Chronic respiratory disease increases risk and associated length of ICU stay</p>
Renal	<p>Underlying disease & cause</p>	<p>Baseline Creatinine/eGFR</p> <p>Consider renal USS if eGFR is less than <50</p>	<p>Post-operative renal dysfunction is common. As a general rule 2% will require haemofiltration with associated increase in mortality/morbidity</p>
Endocrine	<p>Diabetes – Ideally good control required but delaying to optimise is unrealistic</p>	<p>HbA1c</p>	<p>Insulin sliding scale aiming for BM <12 mmol/L</p>
Other	<p>Low Hb or Platelets</p> <p>Previous TIA/CVA</p> <p>Carotid artery stenosis</p>	<p>Require Iron studies</p> <p>CT head</p> <p>Carotid Dopplers</p>	<p>May require investigation for cause and pre-op iron transfusion</p> <p>Those with severe carotid disease or are symptomatic may require pre-cardiac surgery carotid endarterectomy</p>

Figure 1 – Summary of Past Medical History, Examination and Investigations

Medications (Barnard, et al., 2010)

The Cardiac patient is likely to be on a compendium of drugs, some will be long-term and others started acutely (e.g. recent myocardial infarction). Figure 2 contains some general advice regarding common medications. This does not replace a conversation with a Consultant Cardiac Anaesthetist.

Drug	Action	Rationale
ACE inhibitors	HOLD	Intra-operative hypotension
Diuretics	HOLD	Intra-operative hypotension
Oral Hypoglycaemics	HOLD	Risk of hypoglycaemia
Digoxin	HOLD	Theoretical risk of toxicity post bypass
Nicorandil	GIVE	Evidence of cardio-protection
Calcium Channel Blockers	GIVE	Evidence of anti-ischemic properties
Beta Blockers	GIVE	Evidence of cardio-protection

Figure 2 – Perioperative Management of Common Medications

Premedication

Premedication use is common but may not be employed by all anaesthetists, or in certain situations. Specific combinations vary between practitioners. In our institution the following are typically used, with the dose varying depending on patient habitus, risk profile and pre-existing drug history:

Temazepam 20mg +/- Raniditine 300mg +/- Metoclopramide 10mg +/- Omeprazole 20mg (all orally)

Discussion about ICU Journey

It is important to counsel the patient about the nature of the anaesthetic and the anticipated journey through their stay. Evidence suggests that most patients are psychologically and practically underprepared for a planned critical care stay.

Ideally, this discussion should cover the nature of anaesthesia and the associated risks, including (but not limited to) invasive lines, catheter, anaphylaxis, insertion of a trans-oesophageal echo (potential risk of oesophageal injury), and possible need for blood transfusion. There is some debate about specific discussion regarding awareness under anaesthesia.

For the ICU stay you should cover waking up, awareness, confusion, risk of CVA (related to the surgery), (Maing Yin Tang & Amoako, 2013), hallucinations/confusion and return to theatre for re-sternotomy. Approximately 2% of patients will require hemofiltration and those with pre-existing renal disease are at the highest risk. (Sirivella, et al., 2000)

Some patients may not want any specific discussions. This should be clearly documented as having been offered.

Scoring Systems in Cardiac Surgery

The NYHA, CCS and EuroSCORE II scores are required in all cases:

New York Heart Association (Heart Failure) (AHA, 2018)

- | | |
|-----------|---|
| Class I | No symptoms and no limitation in ordinary physical activity, e.g. shortness of breath when walking, climbing stairs etc. |
| Class II | Mild symptoms (mild shortness of breath and/or angina) and slight limitation during ordinary activity |
| Class III | Marked limitation in activity due to symptoms, even during less-than-ordinary activity, e.g. walking short distances (20–100 m). Comfortable only at rest |
| Class IV | Severe limitations. Experiences symptoms even while at rest. Mostly bedbound patients |

Canadian Cardiovascular Society (Angina) (Lucien, 1976), (CCS, 2018)

- | | |
|-----------|---|
| Grade I | Ordinary physical activity does not cause angina, such as walking and climbing stairs. Angina with strenuous or rapid or prolonged exertion |
| Grade II | Slight limitation of ordinary activity. Walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals, or in cold, or in wind, or under emotional stress. Walking more than two blocks or climbing more than one flight of stairs at a normal pace in normal conditions |
| Grade III | Marked limitation of ordinary physical activity. Walking one block or climbing one flight of stairs at a normal pace in normal conditions |
| Grade IV | Inability to carry on any physical activity without discomfort, angina symptoms may be present at rest |

EuroSCORE II (Outcome)

EuroScore II is a risk stratification tool available online which will provide a 30 day mortality risk. The calculation is based upon 18 “risk” factors. These include: age, gender, renal impairment, extra-cardiac arteriopathy, poor mobility, previous cardiac surgery, chronic lung disease, active endocarditis, critical pre-operative state, diabetes on insulin, NYHA status, CCS score, LV function, recent MI, pulmonary hypertension, urgency, weight of intervention and surgery on the thoracic aorta.

See <http://www.euroscore.org/> for the calculator and further information.

References

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Available at:

http://www.heart.org/HEARTORG/Conditions/HeartFailure/AboutHeartFailure/Classes-of-Heart-Failure_UCM_306328_Article.jsp#.WtZTpC7wbIU

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Author: Jake Hartford-Beynon

Editor: Kieran Oglesby

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