Cardiovascular system

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Thirty per cent of patients undergoing non-cardiac surgery will have at least one cardiovascular risk factor. In this group 30-day mortality is 0.5–2% as a result of cardiac complications. Routine pulse, blood pressure and electrocardiogram (ECG) monitoring will detect cardiovascular complications, reduce adverse outcomes and should be recor ded during emergence from, and recovery after, anaesthesia. There are certain categories of patient and procedure for which routine cardiovascular monitoring may be required for 24 hours or longer, usually on a PACU or high-dependency unit. Hypotension In the immediate postoperative period this is associated with adverse outcomes. Hypotension may be due to hypovolaemia, myocardial impairment or vasodilatation from subarachnoid - and epidural anaesthesia. Other causes of hypotension such as /uni25CF /uni25CF /uni25CF /uni25CF

Laboratory testing Increased urea and creatinine Low albumin Preoperative low saturation (<96%) or abnormal chest radiograph Preoperative anaemia (<10 g/dL) FEV /FVC <0.7 and FEV <80% predicted 1 1 , forced expiratory 1 Br J Anaesth 2017; 118 (3): 317–34.

PE, pericardial tamponade and anaphylaxis should also be considered in the di ff erential diagnosis. A high prevalence of diastolic dysfunction is seen in middle- aged patients having non-cardiac surgery . These patients are susceptible to exaggerated hypotension following hypovolaemia and pulmonary oedema in response to fluid overloading. Treatment should be aimed at the cause. Postoperative hypotension leading to end-organ dysfunction (e.g. decreased urine output <0.5 /uni00A0 mL/kg/h, decreased level of consciousness, myocardial ischaemia, capillar y refill >2 seconds) needs immediate management with fluid and may require the use of vasopressors and inotropes. Hypertension Hypertension is also common. It may be due to pain, agitation, anxiety , bladder spasm secondary to urinary catheterisation or pre-existing poorly controlled hypertension. The consequences include bleeding from vascular suture lines, cerebrovascular haemorrhage and myocardial ischaemia or infarction. Myocardial ischaemia Patients with a history of cardiovascular disease or with known cardiac risk factors undergoing major surgery are at risk of major adverse cardiac events (MACE). The spectrum of myocardial damage can range from injury (myocardial injury after non-cardiac surgery [MINS]) to ischaemia or infarction. Symptoms can include retrosternal pain radiating into the neck, jaw or arms, nausea, dyspnoea or syncope, but many events in the perioperative period are silent. ECG changes can include ST elevation in two continuous leads, new left bundle branch block or an arrhythmia. In the case of a non-ST segment myocardial infarction, only a rise in serial troponin levels will clarify the diagnosis. Cardiologists should be inv olved early and may start coronary reperfusion therapy in the form of primary percutaneous coronary intervention or thrombolysis. These should be discussed with the surgical team because of the risk of bleeding after major surgery . Arrhythmias When they occur in the postoperative period, arrhythmias can cause hypotension, myocardial ischaemia and cardiac arrest. Treatment should be guided by the Resuscitation Council UK’s peri-arrest guidelines.

Tachycardia (sinus or supraventricular, including atrial fibrillation) may occur as a result of anxiety , pain, myocardial ischaemia or infarction, hypov olaemia, sepsis, electrolyte imbalance or hypoxia in the postoperative period. Consideration should be given to correction of the underlying causes and the rate controlled with β -blockers, amiodarone or cardioversion, depending on the state of the patient. Sinus bradycardia may be normal in athletes, but it may also be associated with hypoxia, preoperative β -blockers, digoxin and increased intracranial pressur e. Pharmacological options include glycopyrrolate or atropine intravenously . A prolonged QT interval may be seen in the perioperative period. It is multifactorial in origin with most patients having predisposing risk factors, such as long QT syndrome or electrolyte abnormalities. Cardiovascular complications /uni25CF /uni25CF /uni25CF

Hypotension and hypertension in the postoperative period can be multifactorial and result in serious morbidity Arrhythmias can be prevented and corrected by treating hypotension and electrolyte imbalance Arrhythmias, myocardial ischaemia/infarction and stroke will need management with the help of cardiologists and neurologists

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