Postoperative complications

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Bleeding Significant bleeding occurs in approximately 2–3% of patients. Rarely , acute cardiac tamponade or profound hypotension may occur in the early postoperative period and requires emergency resternotomy . Arrhythmias The most common postoperative arrhythmia is sinus tachy cardia, closely followed by atrial fibrillation (AF). AF occurs in around 30–60% of patients undergoing CABG and often spontaneously reverts to sinus rhythm. Treatment includes correction of potassium (>4.5 /uni00A0 mmol/L), the use of β -b lockers, amiodarone or digoxin and, if necessary , cardioversion. pacing wires inserted intraoperatively may be required in the postoperative period. Poor cardiac output state Myocardial function typically declines in the first few hours - following cardiac surgery , presumably in response to isch - aemia/reperfusion-type injury . Inotropic agents are often required at this time to support heart function and maintain the circulation. Occasionally , the patient develops a persistent low cardiac output state. The clinical manifestations include poor peripheral perfusion, low urine output, a de veloping metabolic acidosis and low blood pressure. There are several mechanisms that may cause this compli - cation in the early postoperative period, including depressed myocardial contractility , reduced preload, increased afterload and a disturbance in heart rate or rhythm. Treatment is aimed at the under lying cause but generally includes oxygenation, optimising preload, reducing afterload, managing any rhythm disturbances and impro ving contrac - tility . If the low cardiac output state persists, the heart may require pharmacological or mechanical support. - Pharmacological support Di ff erent agents can be used to support patients after surgery by altering the systemic vascular resistance, increasing the heart rate and increasing the force of myocardial contractility . Commonly used pharmacological agents include dopamine, dobutamine, adrenaline (epinephrine) and noradrenaline (norepinephrine). Mechanical support If low cardiac output persists despite inotropic support, the heart may require mechanical support while it recovers its function. Mechanical support can be achieved using an intra-aortic balloon pump (IABP), ventricular assist device (V AD) or extracorporeal membrane oxygenation (ECMO). An IABP is a device that is inserted, either percutaneously or under direct vision, into the common femoral artery . It is advanced into the aorta until its tip lies just distal to the aortic arch vessels (Figure 59.7). Balloon filling and emptying is trig - gered by the ECG, deflating during ventricular systole (reduc - ing afterload) and inflating in diastole (displacing blood into the coronary arteries retrogradely). A V AD is a mechanical circulatory supporting device used to replace the function of a failing heart. It can be used as a short-term measure typically f or patients recovering from heart attacks or heart surgery (bridge) or as a long-term support for patients with congestive heart failure (destination). Current V AD devices are all continuous flow and have been shown to be superior to pulsatile flow devices. Blood is exposed in these devices to a non-biological surface that can activate proinflam - matory and coagulation cascades, leading to strokes and bleed - ing. Another important complication associated with V AD is infection. ECMO is another circulatory support device that is similar to CPB; it can be established using venous access only (VV-ECMO) or venous and arterial

access (V A-ECMO). Indications for ECMO include neonates and adults with

(a) Balloon Systole Diastole (b) (b) R R T T P P ECG Aortic pressure Balloon in /f_l ation Diastole Systole Diastole Figure 59.7 Intra-aortic balloon pump counterpulsation. (a) The bal loon de /f_l ates during systole and thereby lowers systemic resistance. It in /f_l ates during diastole and increases coronary perfusion in addition to augmenting the systemic blood pressure. (b) The pressure changes and phases of the electrocardiogram (ECG) are

shown.

support or as a temporary stabilisation method for patients who may need a V AD (bridge therapy). Neurological dysfunction Stroke leading to a focal neurological deficit occurs in approxi mately 2% of patients following CABG. Embolisation, probably originating from the aortic arch or heart chambers, is the most common mechanism for territorial infarcts, with hypoperfu sion leading to wa tershed infarcts. Di ff use neurological injury may also occur, leading to subtle cognitive abnormalities in memory , concentration and attention. Wound infection Significant deep wound infection resulting in sternal dehiscence and mediastinitis occurs in around 0.5–2% of patients. This is associated with significant morbidity , with a prolonged hospital stay and further surgical interventions for debridement and/ or rewiring of the sternum. It has a significant mortality rate of up to 40%. Wound infections are more common in those with diabetes, dialysis patients, smokers, patients with high transfusion requirements and the obese. Mortality In the UK, the mortality rate for patients undergoing CABG is 1–3%. Multiple factors have been demonstrated to a ff ect mortality after CABG, including age, gender, existing morbid ities, left ventricular function and the use of LIMA.

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