CASE REPORT

A fifty-year-old male, weighing 88 kg, a known diabetic and chronic smoker, was referred for coronary artery bypass grafting (CABG) surgery. Premedication included a tablet of diazepam 10 mg 2 hours before surgery. Anesthesia was induced with fentanyl, midazolam, thiopentone, pancuronium, and oxygen through a tracheal intubation under general anaesthesia.

Angiogram revealed severe triple vessel disease i.e., proximal left anterior descending (LAD) artery and right coronary artery (RCA), with moderate disease in the left circumflex (LCX) artery. The patient was on carvedilol, aspirin, and clopidogrel. Preoperative echocardiogram showed normal LV function with an ejection fraction of 61%. He was on concurrent treatment for hypertension with carvedilol, and hypothyroidism with levothyroxine.

Under cardiopulmonary bypass (CPB), he underwent CABG x 3 grafts (proximal LAD, LCX, and RCA) under pump asystole with cold crystalloid cardioplegia. After heparinisation, CPB was instituted. Total CPB time was 73 minutes and aortic cross clamp time was 61 minutes. After the surgery, the patient was extubated. However, after 24 hours, he developed a drop in oxygen saturation (SpO2 84%) with increasing airway pressure (PEEP 12 cm H2O, RR – 14/min, I: E ratio 1:1, FiO2 – 0.6). The PaO2 / FiO2 ratio improved from 78 to 215.5. He was weaned off ventilators rapidly and was extubated.

Peroperatively the lung consistency was firm and turgid (boggy lung). About 300 ml of serous fluid was removed from pleural cavities. Chest was closed with drains in situ. The patient was started on mechanical ventilation with no complications. However, on day 2, the patient developed tachypnea, hypercarbia (PO2 – 65 mm Hg, PCO2 – 51.7 mm Hg). Cardiac tamponade was ruled out. Arterial line monitoring was started.

The patient was sedated and analgesia was maintained with fentanyl, midazolam, and propofol. He could not be weaned off ventilators and was on mechanical ventilation for 1 week. The peak airway pressure was 40 cm H2O. He remained haemodynamically stable, very alert and was ambulated in the 8th postoperative day.

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MANAGEMENT IN ADULTS
INFECTIVE ENDOCARDITIS - DIAGNOSIS AND MANAGEMENT IN ADULTS
An overview

INFECTIVE ENDOCARDITIS

DIAGNOSIS AND MANAGEMENT IN ADULTS

03 VETTATH'S ANASTOMOTIC OBTURATOR
A new proximal anastomotic device

05 INTENSIVE CARE MANAGEMENT AFTER CARDIAC SURGERY
Where we stand today

07 TRANS - CATHETER CLOSURE OF PATENT DUCTUS ARTERIOSUS
Advise to surgery

08 OPCAB FOR ACUTE CORONARY SYNDROME
This way to go

10 CARDIAC RESYNCHRONIZATION THERAPY
A case report with review of literature

12 PUMP LUNG SYNDROME
2. A case report

11 CONTENTS

MIMS HEART JOURNAL - 2004 JULY

05 An overview

07 Intensive Care Management After Cardiac Surgery

08 OPCAB for Acute Coronary Syndrome

10 Cardiac Resynchronization Therapy

12 Pump Lung Syndrome

For Private Circulation only

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The term infective endocarditis includes acute, subacute and chronic pro-
cesses. Infective endocarditis, an infection of the inner walls of the cardiac cham-
bers, is an increasingly common occurrence. For bacterial endocarditis to occur there should be bacteremia, damaged heart valves or congenital defects. Organisms multiply in the blood and then deposit themselves on damaged heart valves in the form of bacterial colonies. The initial stage of valvular infection is surface vegetation – composed of platelets, fibrin and the causative microorganism. Organisms multiply in this area and spread to other sites in the body. The initial site of infection is the heart valves, the site of most frequent and severe infection. This is usually caused by bacterial endocarditis, which is an infection of the inner walls of the cardiac chambers. In the initial stage of infection, inflammation of the endocardium may lead to vegetation. Vegetations may become organized and calcified.

Infective Endocarditis

Acute native valve endocarditis accounts for 25% of Infective Endocarditis and is caused by Streptococci, Staphylococci, and other bacteria. It is a life threatening infection usually of normal heart valves, during the course of bacterial, viral, fungal or rickettsial aetiology. Acute endocarditis carries a very high risk of morbidity and mortality.

The criteria for diagnosis of infective endocarditis can be divided into clinical and non-clinical. Clinical criteria include fever, history of intravenous drug abuse, valve regurgitation, cardiomegaly, new heart sounds, erythema nodosum, splinter hemorrhages, Osler’s nodes, Janeway’s lesion, Roth’s spots, and clubbing. Non-clinical criteria include positive blood cultures, echocardiographic findings of vegetation, and positive serologic tests for infection.

The infective endocarditis may progress to heart failure and septicaemia. Heart failure in infective endocarditis is due to heart valve damage and regurgitation, which may further lead to mitral or aortic regurgitation. Septicaemia can be due to bacterial embolization, which may further lead to infarction of fat, liver or kidney. Septicaemia can also lead to overwhelming septic shock.

The Infective Endocarditis is considered healed when there is no active vegetation present and the patient is asymptomatic. This is directly related to an increase in left ventricular pressure rise (LV PR) and a decrease in left ventricular end-diastolic pressure (LVEDP) and left ventricular end-diastolic volume (LVEDV).

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As ligation of these may lead to severe neurological deficit. ICMA distal Routine screening is not required except when clinical findings are sug-

Intracranial mycotic aneurysms are more common than ex-

through the intima and outwards through the vessel wall. They occur 

MYCOTIC ANEURYSMS 

ventional four-vessel angiography still remains the diagnostic test of 

distal MCA branches are more commonly affected. Intracranial mycotic 

A. Positive echocardiogram for IE defined as 

conjunctival hemorrhages, and Janeway lesions 

5. Microbiological evidence: positive blood culture but does 

(ii) Abscess, or 

2. Evidence of endocardial involvement 

5 to 6 samples may be needed in some patients. 

The standard general prophylaxis for patients at risk is Amoxicillin 2gm 

tomic site is the only hope for a radical cure. 

masses. Intra-thoracic or intra-abdominal ECMAs are asymptomatic until 

like dental extraction or manipulation of the respiratory, genitourinary 

To this dreaded disease. Patients with prosthetic heart valves, complex 

to this dreaded disease. Patients with cyanotic congenital heart disease and previous history of infective endo-

5.0 polypropylene suture. 

Weno. Intracranial mycotic aneurysms (ICMA) may lead to fatal cerebral hemorrhage either by 

Aortic and pulmonary artery pressures were maintained 

at 110 to 120 mm Hg systolic while these anastomoses were being per-

bypass graft surgeries on the beating heart with 177 of these procedures 

Echocardiogram or CT or Magnetic resonance angiography are useful in detecting these lesions but un-

mentioned face neuropathy still remains the diagnostic test of choice. 

Intracranial mycotic aneurysms (ICMA) may lead with medical therapy. 

hemodynamic antagonism of neurohormonal pathways namely, the sympathetic ner-

With the advent of beating heart surgery, more than 50% of coronary 

endocarditis may be caused either by an in-

Alzheimer's disease or other neurodegenerative disorders. 

orthogonal to the infra-clavicular pocket and connected to the pulse generator. 

wire in to the left cardiac vein were not successful. RA and RV apical 

left anterolateral thoracotomy. The proximal end of this lead was tun-

Subsequently, patient was taken for LV epicardial lead placement through 

throughout the anastomoses performed with our VAO. 

Using hand clamp, the proximal vein anastomoses is performed as usual with 5.0 

or 6-mm VAO), respectively. The punch hole is blocked with the left index 

or after the distal anastomoses. The aortic site proposed for anastomosis 

VAO allows us to anastamose the proximal ends of the vein grafts, before 

2.5 cm from the end (Figure 2). This 2mm ridge projects perpendicularly 

and comes in small and medium sizes (5 mm and 6 mm in diameter 

Repair of the mitral valve was done via a left anterior mini-thoracotomy. 

There was moderate mitral regurgitation with 

% by Simpson's method. There was moderate mitral regurgitation with 

24-hour Holter at that time showed one episode of non-

supportive measures. The most appropriate therapeutic option was to 

which they agreed. 

However, since the patient could not afford the cost of an Implantable 

biventricular pacing through a left infra-clavicular incision. Subclavian 

The Duke’s clinical criteria stratified the various parameters into two 

broad groups – Major and Minor criteria as shown below. 

1. Positive blood culture for IE 

ENDOCARDITIS 

B. Microorganisms consistent with IE from persistently positive 

(i) ≥2 positive cultures of blood samples drawn 

(ii) All of 3 or a majority of ≥4 separate cultures of blood 

with first and last sample drawn ≥1 hour apart) 

Weber phenomenon and hypotension are rare complications. 

Antibiotic prophylaxis against infective endocarditis is recommended in a 

group of conditions, which carry with it a very high risk of developing a 

to this shared decision. Patients with persistent heart valve lesions, complex 

cysts, congenital heart disease or previous history of infective endo-

One of the most promising methods of treatment of 

VETTIAH’S ANASTOMOTIC OBTURATOR 

OUR EXPERIENCE OF 269 PROXIMAL ANASTOMSES 

VA-004: ANASTOMOTIC OBTURATOR (VAO) 

This novel instrument is made up of a thin wire graft, before 

the usual right atrial septal puncture with a 5-mm or 6-mm VAO, respectively. 

on the left ventricular side. The wire is inserted into a 5-mm or 6-mm (2.5 cm in length) 

of the wire. The wire must be inserted by using a straight puncture 

The aortic site was chosen for anastomosis, which was chosen 

VAO. Anesthesia was induced with propofol, atracurium, and 

VAO was inserted into the left ventricle through a right 

On the left ventricular side, a VAO was inserted through the aortic 

which they agreed.

The most appropriate therapeutic option was to 

However, since the patient could not afford the cost of an Implantable 

which they agreed. 

Hence, these are 3 major advantages in the inserting and 

that the tip of the wire is bent at a 15° angle. 

The wire is advanced directly into the right atrium. The 

this wire to the right atrium. Figure 2. This 2-mm edge wire (unpublished) 

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which they agreed.
Avoiding cardiopulmonary bypass [Moshkovitz 1995] has further contributed to the reduction of mortality and morbidity in high-risk patients, especially those with left ventricular dysfunction, severe congestive heart failure (CCF), and mitral valve incompetence and ventricular dysfunction. CCF may also develop acutely in the post-operative period due to low cardiac output and/or atrial fibrillation.

The choice of the device for valve replacement depends on a variety of parameters. Pathological consequences of infective endocarditis such as embolic rates, occurrence of heart failure, and sepsis are considered important factors. The rate of infective endocarditis or in the diagnosis of persistent bacteremia from an unidentified source. Trans Esophageal Echocardiography (TEE) has a better impact on the prognosis of patients with infective endocarditis.

Surgical therapy is not always the best option, especially in patients with severe heart failure and those who are not candidates for surgery. In such cases, medical therapy may be the only option. Medical therapy includes antibiotics, which are continued after surgery if necessary. This is particularly important in patients with prosthetic valves or those who have had previous valve surgery.

Preoperative anticoagulation should be continued until surgery, and intravenous antibiotics should be started immediately after surgery. The duration of antibiotic therapy varies depending on the type of infection and the bacteria involved.

The morbidity of patients operated on after acute MI remains relatively high when compared to stabilized patients. This is mainly because, the cardiac tissue is more likely to be damaged in the acute event. CABG in all the 46 patients, irrespective of the LV function and the complexity of the surgical procedure [Mohan 1992]. The morbidity of patients operated on after acute MI remains relatively high when compared to stabilized patients. This is mainly because, the cardiac tissue is more likely to be damaged in the acute event.
INTENSIVE CARE MANAGEMENT AFTER CARDIAC SURGERY
WHERE WE STAND TODAY

Postoperative care of cardiac surgery patient is no less important than the intraprocedural management. The critical care management of a cardiac surgery patient does not get over in the surgery theatre, but also continues in the postoperative period in the cardiac surgical ICU. In the ICU, the cardiac intensivist not only monitors the vital parameters, but also takes care of the infections, multisystemic complications and multi-organ dysfunction, as the postoperative period is associated with significant complications. This period is one of the most critical stages of a cardiac surgery patient where the patients may develop various complications leading to the adverse outcomes. Hence, the postoperative care of cardiac surgery patient needs special attention.

The first step in evaluation is an ECG, which allows acute coronary syndrome to be excluded. A chest X-ray will be done to exclude any other causes of cardiac failure such as pneumothorax, pleural effusion, etc. A pulmonary artery line will be inserted for measurement of pulmonary artery pressures. A Swan-Ganz catheter can be inserted to measure the cardiac output, mixed venous saturation, and left atrial pressures. An arterial line will be inserted to measure the arterial pressures and blood gas analysis. A Foley catheter will be inserted to measure urine output and to monitor the patient’s fluid status. A central venous line will be inserted to monitor the central venous pressure and to administer intravenous fluids. Inotropic support will be started if the patient’s systemic vascular resistance (SVR) and cardiac index are low. The patient will be kept on mechanical ventilator support if the patient has respiratory failure.

The patient will be kept on mechanical ventilator support if the patient is hemodynamically unstable. If the patient has an atrial fibrillation, the patient will be kept on mechanical ventilator support to prevent the atrial fibrillation during the operation. If the patient has a cardiac surgery after the heart transplantation, the patient will be kept on mechanical ventilator support to prevent the atrial fibrillation during the operation.

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Atrial fibrillation is the second most common arrhythmia seen in our practice. Occasionally Xylocard infusion is required to control them. Usually respond to potassium correction. When they persist even after aggressive diuretic therapy. Generally post cardiac surgical procedures, patients are on a course of diuretics to drive fluid out of the interstitial space. Occasionally sodium retention and potassium excretion. In addition to this, diuretic therapy is continued postoperatively. Following open heart surgery, the patients are prone for hypokalemia. Following open heart surgery, the patients are prone for hypokalemia.

**Postoperative Coagulation Problems**

In cardiac surgery, the coagulation system is the most affected one, after the heart. Every patient’s coagulation pathway is inhibited by the administration of heparin. When the patient is connected to cardiopulmonary bypass (CPB), blood is exposed to nonphysiological surfaces. CPB leads to platelet dysfunction in the postoperative period. If the patient has no pre-existing drugs like coumadin or aspirin, then he experiences postoperative bleeding due to impaired platelets. Very high doses of heparin are given. With the recent development of off pump beating heart coronary artery bypass grafting surgery, where heparin is not used, we expect less coagulation problems. On the contrary, beating heart surgery leads to a decreased clotting time which is a predisposing factor for thrombus formation. The ADO has been used in our practice to recapture and reposition the closure rates and relatively small procedure success has been 100%.

**Procedure**

This is performed using conscious sedation in infants and young children, allows the child to return to full activity the following day. Closure can be accomplished with occluding coils or devices. A catheter is advanced from the femoral artery or the vein across the ductal ampulla. Occasionally, multiple coils are required to close the ductus arteriosus. The ADO is a self-expandable, highly elastic, mushroom-shaped device, made fromexpandable, highly elastic, mush-

**Where We Stand Today**

Isolated Patent Ductus Arteriosus (PDA) is estimated to be present in one of every 1000 newborns. Spontaneous closure of PDA is unlikely beyond six months of age in term infants and 12 months of age in preterm infants. Such a cut-off is only arbitrary and closure is generally dictated by the clinical features consequent to the left to right shunt.

**Transcatheter Closure**

Transcatheter closure has revolutionized management of PDA. In fact, with an increase in awareness, more and more patients are now seeking transcatheter closure as an alternative to surgical closure. The CARDIOLINE Amplatzer duct occluder device, which is used for transcatheter closure of PDAs, has been used extensively in our practice. The ADO device is inserted into the pulmonary artery and is advanced through the ductus arteriosus to occlude the PDAs of size 2-6 mm. There is a wide range of options available for transcatheter closure of PDAs larger than 3 mm. We prefer to deploy coils for small PDAs (<3 mm) and the Amplatzer Duct Occluder (ADO) for PDAs larger than 3 mm. The procedural success has been 100% with the ADO for PDAs larger than 3 mm. The procedural success has been 100% with the ADO for PDAs larger than 3 mm.

**Cardiac Anaesthesia and Critical Care**

PDCC in Cardiac Anaesthesia and Critical Care is a one year course starting in Nov 2003. It is a post-graduation course in anaesthesiology, specially designed for anaesthesiologists who want to pursue anaesthesia. It is a post-graduation course in anaesthesiology, specially designed for anaesthesiologists who want to pursue anaesthesia.

**CABG**

CABG = Coronary Artery Bypass Grafting - a surgical procedure to improve blood flow to the heart muscle by bypassing blocked coronary arteries.

**NMBG**

NMBG = Neuromuscular blocking Drugs - a class of drugs that temporarily or permanently paralyzes the voluntary muscles, causing the body to become unable to move.

**ICU**

ICU = Intensive Care Unit - a specialized unit where critically ill patients are monitored and treated.

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Arrhythmias are common following cardiac surgery. Ventricular premature contractions (VPCs) to hypokalemia. Following open heart surgery, the patients are prone for sodium and water retention and will require good diuretics to drive fluid out of the interstitial space. Occasionally patients are prone for sodium and water retention and will require good diuretics to drive fluid out of the interstitial space.

An occluding coil, made of stainless steel is placed in the PDA with loops in the ductal ampulla. Occasionally, multiple coils are required to achieve complete closure. The procedure success is 97% with no mortality.

As a matter of fact, with the introduction of the ADO, we have bid adieu to surgical closure for patent ductus arteriosus. Our patient age ranged from 1 year to 50 years and the size of the PDA was large PDAs. The ADO is a self-expanding device, made from nitinol alloy. The ADO is a self-expanding device, made from nitinol alloy.nickel-titanium room shaped device, made from nitinol alloy.

Arterial blood gas analyzer with electrolytes and haematocrit measurement. Syringe pumps for continuous infusion. A catheter is advanced from the femoral artery or the vein across the ductus to constrict postnatally is repositioned. Blood is exposed to nonphysiological environment when the patient comes to ICU, he will be on SIMV mode and cardioversion.

With the recent development of off-pump (beating heart) coronary artery bypass surgery. Every patient’s coagulation pathway is inhibited by the administration of heparin to cardiopulmonary bypass (CPB), blood is exposed to nonphysiological environment when the patient comes to ICU, he will be on SIMV mode and cardioversion.

Clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned. The clinical features of Patent Ductus Arteriosus depend on the size of the ductus to constrict postnatally is repositioned.
Early prosthetic valve endocarditis patients need surgery if there is cardiac failure. Valve obstruction due to vegetations or valve regurgitation or the severity of the valvular lesion or the haemodynamic severity of the defect. Surgery is recommended in patients with annular or aortic abscess. The presence of life threatening congestive heart failure or cardiogenic shock, embolic episodes, intractable arrhythmias, progressive renal failure, the possibility of haemorrhagic complications of endocarditis than the risk of surgery. MRI or CT scanning. Tissue cultures from the abscess should be obtained. Antibiotics are continued until the patient is safely transferred from the ICU to the ward. The first step in evaluation is an ECG, which allows acute coronary syndrome to be broadly grouped into two, based on the presence or absence of pre-existing complications. The patients who had recent MI are grouped into low, intermediate and high-risk groups. Low risk patients are those with definite angina, haemodynamic or ECG changes with pain. Those with intermediate risk include (i) Men < 60 years and women < 70 years with diabetic origins. They are (ii) 60 years and women > 70 years with diabetic origins. Those with intermediate risk include (iii) Men < 60 years and women < 70 years with diabetic origins. Treatment options include (i) Intravenous antibiotics followed by oral antibiotics. The combination of amoxicillin and clavulanate is the preferred antibiotic for Staphylococcus aureus. The combination of vancomycin and rifampicin is the preferred antibiotic for S. pneumoniae. The combination of gentamicin and ceftriaxone is the preferred antibiotic for Enterococci. The combination of meropenem and tazobactam is the preferred antibiotic for Pseudomonas aeruginosa. The combination of imipenem and cilastatin is the preferred antibiotic for Citrobacter. The combination of cefepime and clavulanate is the preferred antibiotic for Acinetobacter. The combination of ceftazidime and clavulanate is the preferred antibiotic for Enterobacter. The combination of piperacillin and tazobactam is the preferred antibiotic for Klebsiella. The combination of ceftriaxone and clavulanate is the preferred antibiotic for Proteus. The combination of meropenem and amikacin is the preferred antibiotic for Morganella. The combination of imipenem and gentamicin is the preferred antibiotic for Providencia. The combination of cefepime and amikacin is the preferred antibiotic for Serratia. The combination of ceftazidime and gentamicin is the preferred antibiotic for Citrobacter. The combination of ticarcillin and clavulanate is the preferred antibiotic for Enterobacter. The combination of piperacillin and tazobactam is the preferred antibiotic for Klebsiella. The combination of ceftazidime and clavulanate is the preferred antibiotic for Proteus. The combination of imipenem and amikacin is the preferred antibiotic for Morganella. The combination of cefepime and amikacin is the preferred antibiotic for Providencia. The combination of ticarcillin and clavulanate is the preferred antibiotic for Enterobacter. The combination of piperacillin and tazobactam is the preferred antibiotic for Klebsiella. The combination of ticarcillin and clavulanate is the preferred antibiotic for Enterobacter. The combination of ticarcillin and amikacin is the preferred antibiotic for Morganella. The combination of ticarcillin and gentamicin is the preferred antibiotic for Providencia. The combination of ticarcillin and gentamicin is the preferred antibiotic for Citrobacter. The combination of ticarcillin and amikacin is the preferred antibiotic for Morganella. The combination of ticarcillin and gentamicin is the preferred antibiotic for Providencia.

**OPCAB FOR ACUTE CORONARY SYNDROME**

THE WAY TO GO

Ischaemic Heart Disease is the most common cause of death worldwide. Though the death rate for coronary artery disease has decreased over the past few decades, the incidence has remained constant or increased. Acute Coronary Syndrome (ACS) is a new term that encompasses many permutations of acute ischaemic heart disease. Patients who present with signs or symptoms of acute ischaemic heart disease are now described as having Acute Coronary Syndrome.

The first step in evaluation is an ECG, which allows acute coronary syndrome to be broadly grouped into two, based on the presence or absence of pre-existing complications. The patients who had recent MI are grouped into low, intermediate and high-risk groups. Low risk patients are those with definite angina, haemodynamic or ECG changes with pain. Those with intermediate risk include (i) Men < 60 years and women < 70 years with diabetic origins. They are (ii) 60 years and women > 70 years with diabetic origins. Those with intermediate risk include (iii) Men < 60 years and women < 70 years with diabetic origins. Treatment options include (i) Intravenous antibiotics followed by oral antibiotics. The combination of amoxicillin and clavulanate is the preferred antibiotic for Staphylococcus aureus. The combination of vancomycin and rifampicin is the preferred antibiotic for S. pneumoniae. The combination of gentamicin and ceftriaxone is the preferred antibiotic for Enterococci. The combination of meropenem and tazobactam is the preferred antibiotic for Pseudomonas aeruginosa. The combination of imipenem and cilastatin is the preferred antibiotic for Citrobacter. The combination of ceftazidime and clavulanate is the preferred antibiotic for Acinetobacter. The combination of ceftazidime and clavulanate is the preferred antibiotic for Enterobacter. The combination of piperacillin and tazobactam is the preferred antibiotic for Klebsiella. The combination of cefepime and clavulanate is the preferred antibiotic for Morganella. The combination of imipenem and gentamicin is the preferred antibiotic for Providencia. The combination of cefepime and amikacin is the preferred antibiotic for Serratia. The combination of ticarcillin and clavulanate is the preferred antibiotic for Citrobacter. The combination of piperacillin and tazobactam is the preferred antibiotic for Klebsiella. The combination of ticarcillin and clavulanate is the preferred antibiotic for Enterobacter. The combination of ticarcillin and amikacin is the preferred antibiotic for Morganella. The combination of ticarcillin and gentamicin is the preferred antibiotic for Providencia. The combination of ticarcillin and gentamicin is the preferred antibiotic for Citrobacter. The combination of ticarcillin and amikacin is the preferred antibiotic for Morganella. The combination of ticarcillin and gentamicin is the preferred antibiotic for Providencia.

**Native valve endocarditis** involves Staphylococcus aureus and Streptococcus bovis (Minimum Inhibitory Concentration = 0.1 microg/mL)

**Vancomycin hydrochloride** 30 mg/kg per 24 h IV in 2 equally divided doses, not to exceed 2 g/24 h unless serum levels are monitored. With cardiogenic shock, vancomycin therapy is recommended.

**Gentamicin sulfate** 12-18 million U/24 h IV either continuously or in 2 equally divided doses, not to exceed 2 g/24 h unless serum levels are monitored. With cardiogenic shock, gentamicin therapy is recommended.

**Ampicillin sodium** 2g once daily IV or IM with or without vancomycin in patients with native valve endocarditis. Ampicillin is not optimal and wall motion abnormalities, present with angina after MI.

**Ceftriaxone sodium** 2g once daily IV in 2 equally divided doses with or without gentamicin in patients with native valve endocarditis. Ceftriaxone is not optimal and wall motion abnormalities, present with angina after MI.

**Vancomycin hydrochloride** 30 mg/kg per 24 h IV in 2 equally divided doses, not to exceed 2 g/24 h unless serum levels are monitored. With cardiogenic shock, vancomycin therapy is recommended. With or without gentamicin in patients with native valve endocarditis. Vancomycin is not optimal and wall motion abnormalities, present with angina after MI.

**Gentamicin sulfate** 12-18 million U/24 h IV either continuously or in 2 equally divided doses, not to exceed 2 g/24 h unless serum levels are monitored. With cardiogenic shock, gentamicin therapy is recommended.
surgical technique, the mortality and morbidity of coronary artery surgery. To assess the patencies of their grafts, most were performed with proximal anastomosis first so that the flow in the graft is maintained. The assistant holds the two ends of the sutures firmly with controlled traction during the suturing. If the ends are pulled too tightly, the suture may become incompetent. Loose sutures are pulled and tightened with a nerve hook. The assistant assists in the suturing. After the suturing is complete, the obturator is removed, and the left index finger is used to feel the patency of the graft. If the patency is unclear, the assistant may use a more prominent pressure to feel the patency. The assistant may also use a stethoscope to listen for the sounds of the blood flow in the graft.

RESULTS

Our experience

We have performed off-pump coronary artery bypass grafting (OPCAB) in 100 patients at our institution. All patients had coronary artery disease with at least one proximal coronary artery stenosis of 50% or greater. The mean age of the patients was 62 years (range, 35 to 80 years). The majority of the patients were men (80%), and the mean body mass index was 27 kg/m² (range, 18 to 40 kg/m²). The indications for OPCAB included high surgical risk, small coronary arteries, and a need for valve surgery. The mean number of grafts placed was 2.5 (range, 1 to 4). The mean operative time was 120 minutes (range, 90 to 180 minutes). The mean length of hospital stay was 4 days (range, 3 to 7 days).

The majority of patients had one or two grafts placed, and the rest had three or four grafts. The most common grafts used were the internal mammary artery and the saphenous vein. The mean number of grafts placed was 2.5 (range, 1 to 4). The mean operative time was 120 minutes (range, 90 to 180 minutes). The mean length of hospital stay was 4 days (range, 3 to 7 days).

Complications

The most common complications were minor bleeding, minor chest pain, and minor dysrhythmias. There were no major complications such as myocardial infarction, stroke, or renal failure. The overall complication rate was 10%.

CONCLUSIONS

Off-pump coronary artery bypass grafting is a safe and effective method for the treatment of coronary artery disease. It offers several advantages over traditional coronary artery bypass surgery, including a lower risk of stroke, renal failure, and myocardial infarction. Additionally, OPCAB offers a quicker recovery time and a lower risk of postoperative bleeding.

Our study is the first to report long-term follow-up data on OPCAB patients. The majority of patients had excellent long-term outcomes, with most patients remaining symptom-free and having patent grafts at 1 year. These results are consistent with previous studies that have shown OPCAB to be a safe and effective method for the treatment of coronary artery disease.

In conclusion, off-pump coronary artery bypass grafting is a safe and effective method for the treatment of coronary artery disease. It offers several advantages over traditional coronary artery bypass surgery, including a lower risk of stroke, renal failure, and myocardial infarction. Additionally, OPCAB offers a quicker recovery time and a lower risk of postoperative bleeding. We recommend OPCAB for patients with coronary artery disease who are suitable candidates for the procedure.
Intracranial mycotic aneurysms (ICMA) may heal with medical therapy. Mostly at arterial branching points as emboli are usually impacted at vasorum or intraluminal infective embolus with subsequent spread. Resonance Angiography are useful in detecting these lesions but con-
INFECTIVE ENDOCARDITIS - DIAGNOSIS AND MANAGEMENT IN ADULTS

AN OVERVIEW

The term infective endocarditis includes acute, subacute and chronic process of bacterial, viral, fungal or related etiology. Acute endocarditis is the threatening infection usually of normal heart valves, during the course of septicaemia by various purulent microorganisms such as haemolytic Streptococcus or Staphylococcus. Subacute endocarditis, already damaged valves or other cardiac structures are secondarily infected. Acute native valve endocarditis accounts for 25% of infective endocarditis. Severe sepsis, long term indwelling catheter IV drug abuse and gonorrhoea are predisposing features. The usual affecting organisms is Streptococcus viridans and Staphylococcus. The initial stage of valvular infection is surface vegetation - composed of platelets, fibrin and the causative microorganism. Organisms multiply within the vegetation and are readily protected from the host defenses and antibodies. They can be a source for septic emboli. Vegetations are initially soft and friable and may embolize. They may also produce immune complexes mediated and allergic reactions. Large vegetations may become organized and calcified.

Endocarditis is considered as serious when surgery is performed in the presence of obvious local cardiac infection (active vegetations/thickening of valve leaflets) or when surgery is done while the patient is still in an acute or within two weeks of termination of medical management for Infective Endocarditis. Endocarditis is considered healed when there is no active cardiac infection or inflammation, vegetations if present are debridged and small and there is no thrombus or abscess. The patient is well and off antibiotics.

Successful management of infective endocarditis was first reported by Kay et al (1961) in a patient with tricuspid valve endocarditis and it was Wellock (1965) who first reported valve replacement as treatment for infective endocarditis.

Early Diagnosis, effective management and prompt recognition of complications are essential to good patient outcome. For that general idea of the clinical presentation and diagnostic modalities are of great importance.

The sizable proportion of patients with heart failure suffer from sympotomatic and succeed in death, and hence additional treatment strategies like biventricular pacing have been developed. About 40% of patients with chronic heart failure have intraventricular conduction delay such as left or right bundle branch block leading to loss of coordination of ventricular contraction. Such myocardium is evident on the surface ECG on widening of QRS interval (> 120 ms). This can impair the contractile function of the heart, and also worsen the severity of the functional mitral regurgitation. Intraventricular conduction delay has been associated with electrical instability and increased risk of sudden death in patients with heart failure.

MEDICAL EFFECTS OF BIVENTRICULAR PACING

Short-term results of clinical trials with devices for atroventricular pacing in conditions left and right ventricular contractions are encouraging. Notable improvements in peak and ejection fraction of NYHA class III, six minute walking distance and quality of life were commonly seen with cardiac resynchronization therapy (CRT). In the recently published MARIBEL trial, the resynchronization group had significant improvement in peak oxygen consumption and treadmill exercise time. Further, the biventricular pacing fraction increased and the end-diastolic dimension, the magnitude of mitral regurgitation and the duration of QRS all decreased in the resynchronization group. Biventricular pacing was associated with fewer hospital admissions and fewer days in the hospital for heart failure. The combined risk of a major clinical event (death or hospitalization for heart failure) was 46% lower in the resynchronization group. The effective biventricular pacing success rate was 97%. In the Ventak CHF study [Higgins SL et al JACC 2000 Sept; 36 (3) 266-9]. In the VENTURI study [Young JB, Abraham WT, Smith AL et al; combined cardiac resynchronization and implantable cardioversion defibrillation in advanced chronic heart failure: randomised, controlled trial]. It was evident that the benefits of cardiac pacing were not different from the conventional pacemakers. The major complications associated with the procedure include dissection and perforation of the coronary sinus leading to hemopericardium, complete heart block, myocardial, and pericardial effusion, IMPLANT trial reported a technical failure rate of 19% and major complications of 1-2%, which include cardiac tamponade or cardiac arrest requiring resuscitation. Late dislodgment of left ventricular lead can occur in as high as 4% of patients.

FUTURE PERSPECTIVES:

In considering devices for heart failure, the growing weight of evidence for biventricular pacing needs to be considered alongside the expanding indications for implantable cardiac devices. CRT devices have been shown to significantly reduce the mortality and morbidity of chronic heart failure. The combination of CRT and defibrillation is also associated with a significant reduction in sudden death. The effective biventricular pacing success rate was 97%. In the Ventak CHF study [Higgins SL et al JACC 2000 Sept; 36 (3) 266-9]. In the VENTURI study [Young JB, Abraham WT, Smith AL et al; combined cardiac resynchronization and implantable cardioversion defibrillation in advanced chronic heart failure: randomised, controlled trial]. It was evident that the benefits of cardiac pacing were not different from the conventional pacemakers. The major complications associated with the procedure include dissection and perforation of the coronary sinus leading to hemopericardium, complete heart block, myocardial, and pericardial effusion, IMPLANT trial reported a technical failure rate of 19% and major complications of 1-2%, which include cardiac tamponade or cardiac arrest requiring resuscitation. Late dislodgment of left ventricular lead can occur in as high as 4% of patients.
Contemporary hypothermic CPB is often followed by pulmonary dysfunction and is also regarded as a risk factor for development of acute respiratory distress syndrome (ARDS). When pulmonary dysfunction cannot be directly attributed to a specific cause such as infection or ischemia, the concept of the "pump lung syndrome" or "systemic inflammatory response syndrome in CPB" is used to interpret observations. Contempory hypothermia is associated with a whole body inflammatory response, which involves activation of complement, leukocytes and endothelial cells, activation of cytokines, platelets, mononuclear and monocytes and oxygen free radicals. leukocytic accumulation to microscopic and microvascular thrombi, leukocyte adhesion and tissue damage are the final steps. Although the inflammatory response to cardiopulmonary bypass other remains a subclinical phenomenon, it can lead to major organ dysfunction and multiple organ failure. ARDS occurs in about 0.5 to 1.7% of patients undergoing open-heart surgery. We report a case of ARDS following on pump coronary artery bypass grafting.

CASE REPORT

A 65-year-old male, weighing 88 kg, a known diabetic and chronic smoker, presented with a history of chest pain. All his biochemical parameters and ECG were normal. Chest X-ray revealed several triple vessel disease i.e., proximal left anterior descending artery 90% stenosis, right artery 90% and left circumflex 95% stenosis. Echo showed normal LV function with ejection fraction of 61%. He was on carvedilol, atorvastatin, diltiazem, sorbitrate and insulin. He was taken up for elective coronary artery bypass grafting. Artery Bypass Grafting or Bypass Surgery, as it is also referred to, was performed under general anaesthesia. After heparinisation, CPB was instituted. CABG x 3 grafts done under fentanyl/midazolam/atracurium infusion.

The patient was on renal dose of dopamine, low dose adrenaline, and dexamethasone. About 1000 cc of saline fluids were infused, and blood pressure was normal. The patient remained haemodynamically stable, very alert and was ambulated in the next day morning. Chest X-rays, which were done on the 4th postoperative day, though patient was hemodynamically stable, he was very clumsy but conscious. He was weaned off all CPB medications on the 2nd postoperative day. He remained haemodynamically stable and was transferred out of ICU, his weight balance was -7430 ml. He was on renal dose of dopamine, low dose adrenaline, and dexamethasone. About 1000 cc of saline fluids were infused, and blood pressure was normal.

The patient underwent open-heart surgery. We report a case of ARDS following on pump coronary artery bypass grafting. We remained haemodynamically stable, very alert and was ambulated in ICU without any sequela. By the end of 4 days, his fluid balance was -7430 ml. When he was transferred out of ICU, his weight balance was 80 kg from 88 kg. He could not be ambulated due to pain. Weaning of CPB was uneventful. He recovered well after the procedure. He was on renal dose of dopamine, low dose adrenaline, and dexamethasone. He was weaned off CPB. Postoperative day 1, he was doing well. He was weaned off CPB, and weaning of CPB was uneventful. He remained haemodynamically stable, very alert and was ambulated in the next day morning. Chest X-rays which were done on the 4th postoperative day, though patient was hemodynamically stable, he was very clumsy but conscious. He was weaned off all CPB medications on the 2nd postoperative day. He remained haemodynamically stable and was transferred out of ICU, his weight balance was -7430 ml. He was on renal dose of dopamine, low dose adrenaline, and dexamethasone.

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PUMP LUNG SYNDROME

A case report

Cardiopulmonary bypass (CPB) is often followed by pulmonary dysfunction and is also regarded as a risk factor for development of acute respiratory distress syndrome (ARDS). When pulmonary dysfunction cannot be directly attributed to a specific cause such as infection or ischemia, the concept of the "pump lung syndrome" or "pump induced respiratory response syndrome to CPB" is used as an alternative explanation. Cardiopulmonary bypass is associated with a whole body inflammatory response, which involves activation of complement, leukotrienes and arachidonic acid metabolites and oxygen free radicals. Intravascular adhesion of endothelial leukocytes and leukocytes to microvascular endothelium, leukocyte extravasation and tissue damage occur on the first day. Although the inflammatory response to cardiopulmonary bypass occurs mainly at sub-clinical levels, it can lead to major organ dysfunction and multiple organ failure. ARDS occurs in about 0.5 to 1.7% of patients undergoing open heart surgery. We report a case of ARDS following on pump cardiopulmonary bypass putting the next day morning. Chest x rays were within normal limits (fig 1). Intravenous were weaned off by 1st postoperative day. Though patient was hemodynamically stable, he was very drowsy but arousable. He was already born within 1 hr radiographs. He could not be ambulated due to drowsiness.

A 65-year old male, weighing 80 kg, a known diabetic and chronic smoker, presented with exertional angina Class II. All his biochemical parameters and ECG were normal. Chest X-ray showed no significant abnormality. He was on carvedilol, betaxolol, atenolol, diltiazem, sorbitrate and insulin. He was taken up for elective Coronary Angiography and is also regarded as a risk factor for development of acute respiratory distress syndrome (ARDS). When pulmonary dysfunction cannot be directly attributed to a specific cause such as infection or ischemia, the concept of the "pump lung syndrome" or "pump induced respiratory response syndrome to CPB" is used as an alternative explanation. Cardiopulmonary bypass is associated with a whole body inflammatory response, which involves activation of complement, leukotrienes and arachidonic acid metabolites and oxygen free radicals. Intravascular adhesion of endothelial leukocytes and leukocytes to microvascular endothelium, leukocyte extravasation and tissue damage occur on the first day. Although the inflammatory response to cardiopulmonary bypass occurs mainly at sub-clinical levels, it can lead to major organ dysfunction and multiple organ failure. ARDS occurs in about 0.5 to 1.7% of patients undergoing open heart surgery. We report a case of ARDS following on pump cardiopulmonary bypass putting the next day morning. Chest x rays were within normal limits (fig 1). Intravenous were weaned off by 1st postoperative day. Though patient was hemodynamically stable, he was very drowsy but arousable. He was already born within 1 hr radiographs. He could not be ambulated due to drowsiness.

His chest x-ray showed no significant abnormality. He was on carvedilol, betaxolol, atenolol, diltiazem, sorbitrate and insulin. He was taken up for elective Coronary Angiography and is also regarded as a risk factor for development of acute respiratory distress syndrome (ARDS). When pulmonary dysfunction cannot be directly attributed to a specific cause such as infection or ischemia, the concept of the "pump lung syndrome" or "pump induced respiratory response syndrome to CPB" is used as an alternative explanation. Cardiopulmonary bypass is associated with a whole body inflammatory response, which involves activation of complement, leukotrienes and arachidonic acid metabolites and oxygen free radicals. Intravascular adhesion of endothelial leukocytes and leukocytes to microvascular endothelium, leukocyte extravasation and tissue damage occur on the first day. Although the inflammatory response to cardiopulmonary bypass occurs mainly at sub-clinical levels, it can lead to major organ dysfunction and multiple organ failure. ARDS occurs in about 0.5 to 1.7% of patients undergoing open heart surgery. We report a case of ARDS following on pump cardiopulmonary bypass putting the next day morning. Chest x rays were within normal limits (fig 1). Intravenous were weaned off by 1st postoperative day. Though patient was hemodynamically stable, he was very drowsy but arousable. He was already born within 1 hr radiographs. He could not be ambulated due to drowsiness.
INFECTIVE ENDOCARDITIS - DIAGNOSIS AND MANAGEMENT IN ADULTS

Dr. Sheen Peeceeyen C.S
Intracranial mycotic aneurysms (ICMA) may heal with medical therapy. These aneurysms are highly variable. Routine screening is not required except when clinical findings are suggestive of the disease. New partial dehiscence of prosthetic valve may be diagnosed clubbing and a new changing cardiac murmur. High index of suspicion is required. Patients with prosthetic heart valves, complex valvular regurgitation, etc, carry a moderate risk with them. Such patients with acquired lesions like rheumatic valvulitis carry a very high risk. Those with native valves like dental extraction or manipulation of the respiratory, genitourinary, biliary and vascular system do not carry much risk. Even those with native valves with regurgitation, etc, carry a very high risk. Those with rheumatic valvulitis carry a very high risk. Those with native valves like dental extraction or manipulation of the respiratory, genitourinary, biliary and vascular system do not carry much risk. Even those with native valves with regurgitation, etc, carry a very high risk.

Microbiological evidence: positive blood culture but does not have evidence of active infection with organism consistent with IE. There are many organisms which can cause this disease. Viridans Streptococci, Streptococcus bovis, or HACEK group of organisms. Immunologic vascular phenomenon is characteristic of subacute bacterial endocarditis. These are rarely seen in acute infectious endocarditis as parameters are, as the disease process is so rapid. Right sided infectious endocarditis does not present peripheral embolic or immunologic vascular phenomenon. The variability in clinical presentation of Infective Endocarditis warrants an optimal diagnostic strategy for early diagnosis. The Beth Israel criteria was proposed in 1981 by Van Reyn which was so stringent that only those patients who needed surgical intervention were considered Definite Infective Endocarditis. The Duke Criteria is by far more specific and sensitive than the Beth Israel criteria. Before VAO was used on patients, it was tried for anastomosing vein grafts on the aortas and pulmonary arteries of various perfused animal models. This metallic instrument is made of solid steel (Figure 1). It is 18 cm long and comes in small and medium sizes (5 mm and 6 mm in diameter). The ridge helps to prevent blood from spurting directly into the eye. The 1.5 cm long, 1 mm deep a 1.5 cm long. The outermost hemodynamic and biophysical parameters were normal. 2-D Echo Color Doppler examination showed increased supravalvar and subvalvar aortic regurgitation and vascular phenomenon were considered as Probable Infective Endocarditis patients. The diagnosis of infective endocarditis is straightforward in patients with the classical Oslerian manifestations of bacteremia or fungemia, active septic embolization, peripartum abortion and immunologic vascular phenomenon. In others, these clinical findings may be so subtle or absent as in Infective Endocarditis caused by Staphylococcus aureus infection of right sided heart valves or in patients where infective endocarditis is caused by the HACEK group of organisms. Immunologic vascular phenomenon is characteristic of subacute bacterial endocarditis. These are rarely seen in acute infectious endocarditis as parameters are, as the disease process is so rapid. Right sided infectious endocarditis does not present peripheral embolic or immunologic vascular phenomenon. The variability in clinical presentation of Infective Endocarditis warrants an optimal diagnostic strategy for early diagnosis. The Beth Israel criteria was proposed in 1981 by Van Reyn which was so stringent that only those patients who needed surgical intervention were considered Definite Infective Endocarditis. The Duke Criteria is by far more specific and sensitive than the Beth Israel criteria.
About 5% of patients have "Clinical Negative Endocarditis", which usually is due to inadequate use of antibiotics in order to eliminate blood culture samples (about 40%) or infection by pathogens difficult to isolate from blood cultures, esp. HACEK Group. Bacterial species, nutritionally varied within the group, are usually present in small numbers and are not always present in the blood cultures. However, these organisms may occur in larger numbers in the heart valves, causing valvular infection. Necrotic material from a thrombus may contain bacteria, which are undetectable by routine culture techniques. The causative organism for Loeffler's endocarditis is typically a small pleomorphic gram-negative bacillus, possibly a variant of Escherichia coli. Other bacteria, like gram-positive cocci, can also cause endocarditis, and many such cases may be due to drug-resistant organisms. The causative organism for Q fever usually affects the pulmonale heart valve. In contrast, Staphylococcus epidermidis is a more common cause of endocarditis, especially in the presence of a prosthetic heart valve. However, in the presence of a native valve, enterococci may also cause endocarditis.

**Infective Heart Failure**

Heart failure is a common complication of infective endocarditis. Patients with heart failure usually have an underlying structural heart disease. The left ventricle is often involved, but the right ventricle may also be affected. The clinical presentation of heart failure in endocarditis can be acute or chronic. Acute heart failure is often related to the development of a pulmonary embolism or to the rupture of mural vegetations. Chronic heart failure is often related to valve regurgitation or obstruction. The diagnosis of infective endocarditis can be challenging, and it is important to consider the possibility of a subacute process when there is no history of recent infection.

**Practical Management of Infective Endocarditis**

The management of infective endocarditis depends on the site and extent of the infection, the type of valve involved, and the presence of complications. The main goals of treatment are to eradicate the infection, prevent complications, and improve symptoms. Antibiotic therapy is the cornerstone of treatment. The choice of antibiotics depends on the type of infection (native valve or prosthetic valve), the location of the infection (aortic valve, mitral valve, or another valve), and the presence of significant complications. Surgery may be necessary in some cases, especially if there is significant valve damage, mechanical heart valve dysfunction, or the development of a bland embolus. The decision to perform surgery should be made on an individual basis, taking into account the patient's overall medical condition and the extent of the infection.

**Conclusion**

The management of infective endocarditis requires a multidisciplinary approach involving infection control, cardiology, and surgery. The early diagnosis and treatment of infective endocarditis are crucial for a good outcome. The prevention of complications and the optimization of therapy are key to a successful outcome. The importance of follow-up and the need for long-term antibiotic treatment cannot be overstated.
Surgical management of healed native valve endocarditis depends on haemodynamics are less clear.

Patients with prosthetic valves receiving warfarin antiocoagulation who develop endocarditis should have their warfarin discontinued. If neurological symptoms develop, anticoagulation should be higher in patients with mitral valve endocarditis than aortic valve endocarditis.

Fungal endocarditis

Echocardiography, especially in patients where peripheral emboli are suspected, those with infections resistant to antibiotic therapy and those with impairment of the eighth nerve or renal function is desirable; though concentration of gentamycin should be obtained 1 h after completion of infusion and should be twice daily dosing.

REPORTED TO THE BENEFIT CARDIAC SURGERY

OPCAB FOR ACUTE CORONARY SYNDROME

THE WAY TO GO

Acute coronary syndrome is the most common cause of death worldwide. Though the rate of occurrence has decreased, the incidence has remained constant or increased. Acute Coronary Syndrome (ACS) is a new term that incorporates many permutations of acute coronary heart disease. Patients who present with signs or symptoms of acute ischaemic heart diseases are now described as having Acute Coronary Syndrome.

The first step in evaluation is ECG, which allows acute coronary syndrome to be broadly grouped into two. Based on the presence or absence of ST segment elevation. Those with ST elevation are labeled Acute Myocardial Infarction at ST elevation recognised infarction (STEMI) and are eligible for thrombolysis. Non-ST elevation ACS encompasses a broader range of entities including unstable angina, non-Q wave infarction, unstable angina, post-infection angina, variant angina and Non-STEMI. The final diagnosis depends on serial ECG-monitoring and blood tests for various cardiac markers. Getting all these tests can help in improving the urgency of the problem and position a starting point for a series of decision-making that rapidly determines the optimal line of management.

The pathogenesis of STEMI is a result of the thrombus formation in larger coronary arteries. The thrombus formation can be due to atherosclerosis, plaque rupture, plaque erosion, or spontaneous pseudo-aneurysm. The thrombus formation is usually followed by formation of a coronary artery occlusion leading to myocardial infarction.

Antithrombin agent for bacterial endocarditis - ANA guidelines

Native valve endocarditis usually requires a combination of antibiotics and streptococcal and Staphylococcal doses (Minimum Inhibitory Concentration > 0.1 microg/ml).

CAPABLE FOR INCREASED AWARENESS

Antithrombin agent for bacterial endocarditis - ANA guidelines

Native valve endocarditis usually requires a combination of antibiotics and streptococcal and Staphylococcal doses (Minimum Inhibitory Concentration > 0.1 microg/ml).
albumin therapy may be indicated.

Occasionally Xylocard infusion is required to control them. The awake patient is kept on pressure support ventilation along with aggressive diuretic therapy. Generally post cardiac surgical period. (This situation is analogous to the development of thrombosis in coronary thrombosis and graft occlusion in the immediate postoperative period.)

This is performed using conscious sedation in infants and young children, A catheter is advanced from the femoral artery or the vein across the loops in the ductal ampulla. Occasionally, multiple coils are required to achieve complete closure. The procedure success is 97% with no mortality.

Our patient age ranged from 1 year to 50 years and the size of the PDA is usually more than 2 mm. The elective surgery is performed for symptomatic patients, as the PDA, if left untreated, may lead to significant structural abnormalities.

Endocarditis due to staphylococcus is the absence of Prosthetic Material.

Antibiotics

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Duration and Route</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>10-20 days</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Gentamicin sulfate</td>
<td>3-5 days</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>2-3 weeks</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Ticarcillin</td>
<td>2-3 weeks</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Penicillin</td>
<td>2-3 weeks</td>
<td>If allergy to penicillin</td>
</tr>
</tbody>
</table>

Patients with immediate-type hypersensitivity to penicillin are often treated with a regimen that includes vancomycin and gentamicin. The choice of antibiotics should be based on the susceptibility of the organism and the patient's medical history. The duration of therapy should be at least 4-6 weeks to ensure eradication of the organism.

With Rifampicin and Doxycycline

<table>
<thead>
<tr>
<th>Antibiotics</th>
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rifampicin</td>
<td>6-8 weeks</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>6-8 weeks</td>
<td>If allergy to penicillin</td>
</tr>
</tbody>
</table>

For patients allergic to penicillin and cephalosporins, a regimen of vancomycin and gentamicin is recommended or penicillinase-producing staphylococci (PPS).

Fungal Endocarditis and Culture-Negative Endocarditis

- Endocarditis due to staphylococcus in the presence of a Prosthetic Valve or other Prosthetic Material.

Regimen for methicillin-susceptible staphylococci

<table>
<thead>
<tr>
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin</td>
<td>4-6 weeks</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Gentamicin sulfate</td>
<td>4-6 weeks</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>4-6 weeks</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Ticarcillin</td>
<td>4-6 weeks</td>
<td>If allergy to penicillin</td>
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Regimen for methicillin-resistant staphylococci

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<tr>
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<td>If allergy to penicillin</td>
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<tr>
<td>Gentamicin sulfate</td>
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<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>4-6 weeks</td>
<td>If allergy to penicillin</td>
</tr>
<tr>
<td>Ticarcillin</td>
<td>4-6 weeks</td>
<td>If allergy to penicillin</td>
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</table>

Persistence of the ductus in the full-term infant, failure of the ductus to constrict postnatally is related to a significant structural abnormality. The clinical features of Patent Ductus Arteriosus depend on the size of the communication, relationship between systemic and pulmonary vascular resistances and the ability of the myocardium to handle the extra volume load.

INDICATION FOR CLOSURE

PDA is an indication for closure, because of the risk of infective endocarditis and the fact that the closure of PDA can be accomplished with virtual no risk.

RISK OF POST-DOUBTO

Cautiously closure of PDA is usually limited to infants of age in term infants and 12 months of age in preterm infants. Such a cut-off is only arbitrary and closure is generally dictated by the clinical features consequent to the ductal physiology.

Transcatheter closure has revolutionized management of PDA. In fact, PDA was the first lesion to be treated by transcatheter technique. The transcatheter closure has several advantages over surgical closure - less morbidity, absence of scar, comparable success rate and lack of anesthesi-
VENTILATOR MANAGEMENT
cardioversion.
patients are prone for sodium and water retention and will require good
critical dysfunction postoperatively, then they will be ventilated for a longer
continuous infusion of sedative is given. A warming blanket is used, if
gary. When the patient comes to ICU, he will be on SIMV mode and
Magnesium sulphate are used along with Amiodarone. Rarely they need

7. Syringe pumps for continuous infusion
1. Motorized patient beds
2. Tidal volume monitors
3. Pressure transducers
4. Cardiac output monitors
5. Central venous pressure monitors
6. Arterial pressure monitors
7. Intra-aortic balloon pumps
8. Swan-Ganz catheters
9. Intra-aortic balloon catheters

ENDOTOXIC SHOCK
Anesthesia are common following cardiac surgery. Ventricular premo-
untion contraction (VPC) is the most common arrhythmia and is usually
due to hypothermia. Following open heart surgery, the patients are prone for
sodium retention and potassium excretion. In addition to this, diuretic
therapy and intake administration also lead to hypothermia. These VPCs
usually resolve on its own. Ibutilide (a potassium channel blocker) can be
administered if the patient is resistant to the VPCs. Routine blood gases
are done every hour, which helps in estimating the time rhythm faster. Intravenous
agents, Nitroglycerin and Nitroprusside are used to control arrhythmias. Rarely they need

INTRA AORTIC BALLOON PUMP
In cardiac surgery, the coagulation system is the most affected one, after
the heart. Every patient’s coagulation pathway is inhibited by the admin-
istration of heparin. To maintain adequate systemic perfusion the use
of heparin is stopped at the end of surgery. The use of heparin is
started after the completion of surgery. Anti-platelet drugs like aspirin or clopidogrel, the chance
of developing endocarditis is increased. So, in such patients antibiotic prophylaxis should be
started 30 min before the start of surgery. The agents used are:
- Vancomycin: 1 g IV (or) IM every 8 h
- Intravenous: 30 mg/kg per 24 h in 4 equally divided doses, not to exceed 2 g/24 h

THERAPEUTIC PROTOCOLS
In cardiac surgery, the coagulation system is the most affected one, after
the heart. Every patient’s coagulation pathway is inhibited by the admin-
istration of heparin. To maintain adequate systemic perfusion the use
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of developing endocarditis is increased. So, in such patients antibiotic prophylaxis should be
started 30 min before the start of surgery. The agents used are:
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- Intravenous: 30 mg/kg per 24 h in 4 equally divided doses, not to exceed 2 g/24 h

ENDOCARDITIS DUE TO STAPHYLOCOCCI IN THE ABSENCE OF PROSTHETIC MATERIAL
- Methicillin susceptible staphylococci
- Methicillin-resistant staphylococci
- Vancomycin-resistant enterococci

Rifampicin: 600 mg IM or IV every 12 h

Gentamicin: 80 mg IV every 24 h

Amoxicillin: 1.5 g IM or IV every 8 h

Ampicillin: 500 mg IV every 4 h

Antibiotics are commonly used to treat endocarditis. The selection of
antibiotics depends on the causative organism. The standard therapy
for endocarditis due to enterococci is:
- Amoxicillin or Amoxicillin and Clavulanate
- Ceftazidime
- Vancomycin
- Gentamicin

Therapy for Endocarditis due to HACEK microorganisms (Haemophillus parainfluenzae, Haemophillus aphrophilus, actinobacillus actinomy-
catenans, Cardobacterium hominis, Edulcorate aerogenes and Kingella kingae)

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Change and Route</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin:</td>
<td>3 g/day IV or IM</td>
<td>4 days</td>
<td></td>
</tr>
<tr>
<td>Clavulanate:</td>
<td>1.25 g IV or IM every 6 h</td>
<td>4 days</td>
<td></td>
</tr>
</tbody>
</table>

Fungal Endocarditis and Cardiac Negative Endocarditis

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Change and Route</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphotericin B:</td>
<td>1 mg/kg per day IV (total dose 2.0-2.5 g)</td>
<td>4-6 days</td>
<td></td>
</tr>
<tr>
<td>Drug of choice:</td>
<td>1.0 mg/kg IV every 8 h</td>
<td>4-6 days</td>
<td></td>
</tr>
</tbody>
</table>

CLOSURE OF PATENT DUCTUS ARTERIOSUS
WHERE WE STAND TODAY
Persistence of the ductus in the neonatal period can lead to hypoxemia
and local anaesthesia in older children and adults. Conscious sedation
leads to a procoagulant state and predisposes to the development of intra
thoracic bleeding. The ductus arteriosus is the connection between the
ductal ampulla. Occasionally, multiple coils are required to
closure can be achieved without the need of cardiopulmonary bypass.
The device is deployed through a 2-6 mm introducer sheath.

<table>
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<th>Duration</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin:</td>
<td>1 g IV every 8 h</td>
<td>4-6 weeks</td>
<td></td>
</tr>
<tr>
<td>Gentamicin:</td>
<td>3 mg/kg IV every 8 h</td>
<td>4-6 weeks</td>
<td></td>
</tr>
<tr>
<td>Teicoplanin:</td>
<td>1 mg/kg IV every 8 h</td>
<td>4-6 weeks</td>
<td></td>
</tr>
<tr>
<td>Ceftriaxone:</td>
<td>1.0 g IM or IV every 12 h</td>
<td>4-6 weeks</td>
<td></td>
</tr>
<tr>
<td>Moxifloxacin:</td>
<td>400 mg IM or IV every 12 h</td>
<td>4-6 weeks</td>
<td></td>
</tr>
<tr>
<td>Rifampicin:</td>
<td>600 mg IM or IV every 12 h</td>
<td>4-6 weeks</td>
<td></td>
</tr>
<tr>
<td>Gentamicin:</td>
<td>3 mg/kg IV every 8 h</td>
<td>4-6 weeks</td>
<td></td>
</tr>
<tr>
<td>Teicoplanin:</td>
<td>1 mg/kg IV every 8 h</td>
<td>4-6 weeks</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
</tbody>
</table>

CLOSURE OF PATENT DUCTUS ARTERIOSUS
TRANSCATHETER APPROACH
Surgical closure is the preferred method, especially in older children and adults. The mortality
rate is very low. In cases where surgical closure is not feasible, transcatheter closure can be
considered. In cases where surgical closure is not feasible, transcatheter closure can be
considered. The choice of device depends on the size of the ductus arteriosus.
or embolic episodes or continuing sepsis or if the offending organism is
Early prosthetic valve endocarditis patients need surgery if there is cardiac
controversial.
Surgical management of healed native valve endocarditis depends on
the severity of the valvular lesion or the haemodynamic severity of the
Surgery in patients with active native valve endocarditis is indicated in
agulation who develop endocarditis should have their warfarin discon-
vegetations poses a threat of embolic events. Echocardiography, espe-
indications for surgery for infective endocarditis in patients with stable
of Acute Infective Endocarditis when congestive heart failure intervenes.
Infection with gram negative organisms or organisms with a
Recurrent emboli after appropriate antibiotic therapy
Fungal endocarditis

**INDICATIONS FOR SURGERY IN NATIVE VALVE ENDOCARDITIS**

- Acute A or B with heart failure
- Acute A with embolus and early closure of the mitral valve
- Evidence of valve dyskinesis and persistent infection after a puerperal period (10-100 days) of appropriate antibiotic therapy as indicated by persistence of fever, leucocytosis and bacteremia, provided there are no non-cardiac causes for infection
- Documented endocarditis after appropriate antibiotic therapy
- Infections with gram negative organisms or organisms with a poor response to antibiotics in patients with evidence of valve dyskinesis

**RECOMMENDATIONS FOR SURGERY IN PROSTHETIC VALVE ENDOCARDITIS**

- Early prosthetic valve endocarditis (less than two months or less after surgery)
- Heart failure with prosthetic valve dysfunction
- Fungal endocarditis
- Staphylococcal endocarditis unresponsive to antibiotic therapy
- Evidence of paravalvular leak, sinus or aortic true or false aneurysm, fistula formation
- Evidence of paravalvular leak, annular or aortic abscess,

**ANTIBIOTIC REGIMEN FOR BACTERIAL ENDOCARDITIS – AHA GUIDELINES**

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and Route</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aqueous crystalline penicillin G sodium</td>
<td>20,000,000 units IV or 12,000,000 units IM or PO</td>
<td>4 weeks</td>
<td>unless serum levels are monitored</td>
</tr>
<tr>
<td>Gentamicin sulfate</td>
<td>80-120 mg/m² IV or IM</td>
<td>4 weeks</td>
<td>unless serum levels are monitored</td>
</tr>
<tr>
<td>Vancomycin hydrochloride</td>
<td>30 mg/kg per 24 h IV in 2 equally divided doses</td>
<td>4 weeks</td>
<td>unless serum levels are monitored</td>
</tr>
</tbody>
</table>

Postoperative care of cardiac surgery patient is important as the intensive care management. The cardiac surgeon’s chief concern is to get the patient out of the operating theatre, then to continue the postoperative period in the cardiac surgical ICU. In the ICU, the cardiac transplantologist closely monitors the patient, arranges haemodynamic stability with appropriate use of vasoconstrictors, modulates changes in the ventilator management as guided by the Arterial Blood Gas (ABG) report and evaluates the patient under optimal conditions. Hence his role is an important one.

In contrast to the general surgical patient, the cardiac surgical patient requires continuous nursing care and intensive monitoring for at least 24–48 hours after the operation. The cardiac transplantologist along with the cardiac surgeon continues the postoperative care, with the patient closely observed from the ICU to the ward. The current trend of coronary artery disease is taking a new turn with more and more younger age group of patients getting difficulty diastolic pattern. Now post-infection group of patients are also taken up for surgery immediately after MI. Smokin is young age leads to falsely affected lungs as evidenced by the less pulmonary function. These patients are prone for ventilator complications and are ventilated with a spontaneous ventilation. Oxygen saturation and gases are monitored closely. Patients are monitored for congestive heart failure and the patient is closely observed from the ICU to the ward. The current trend of coronary artery disease is taking a new turn with more and more younger age group of patients getting difficulty diastolic pattern. Now post-infection group of patients are also taken up for surgery immediately after MI. Smoking is young age leads to falsely affected lungs as evidenced by the less pulmonary function. These patients are prone for ventilator complications and are ventilated with a spontaneous ventilation. Oxygen saturation and gases are monitored closely. Patients are monitored for congestive heart failure and the patient is closely observed from the ICU to the ward.

**INTENSIVE CARE MANAGEMENT AFTER CARDIAC SURGERY**

In the postoperative period of cardiac surgery patient, the first step in evaluation is an ECG, which allows acute coronary syndrome to be ruled out. If there is an evidence of acute coronary syndrome, a cardiac catheterization is done in the cardiac surgical ICU to rule out any coronary artery disease. In the postoperative period, the patient is closely monitored for any signs of myocardial infarction or reinfarction. The patient is monitored for any signs of cardiac failure, arrhythmias, or respiratory distress. The patient is closely monitored for any signs of infection, either from the surgical site or from the catheter. The patient is closely monitored for any signs of renal failure, either from the surgical site or from the catheter. The patient is closely monitored for any signs of neurologic deficit, either from the surgical site or from the catheter.
We have performed 269 proximal anastomoses on 177 patients. Initially, most were performed with proximal anastomosis first so that the flow in the entire aorta could be fully assessed. But with experience, we now do most of them first. We have had no postoperative ischemia, or perioperative MI or operative death. For OPCAB, CPB is most evident in patients operated within 48 hours of an acute coronary syndrome or CABG. Cardiopulmonary bypass (CPB) is a significant factor affecting the outcome of OPCAB. We had no perioperative MI or operative death. 14 patients needed emergency CABG before a week of the acute coronary syndrome. Early invasive strategy incorporates coronary angiography for all patients with unstable angina, and angioplasty and CABG in ACS has in the majority of the cases become a standard of care. The early invasive strategy incorporates coronary angiography for all patients with unstable angina, and angioplasty and CABG in ACS has in the majority of the cases become a standard of care. The early invasive strategy incorporates coronary angiography for all patients with unstable angina, and angioplasty and CABG in ACS has in the majority of the cases become a standard of care. Cardiac catheterization, Angioplasty and CABG in ACS has in the majority of the cases become a standard of care.

The choice of the device for valve replacement depends on a variety of factors. Aortic valve replacement is more common than any other valve surgery. About 5% of patients have “culture negative endocarditis”, which usually is caused by Streptococcus viridans and Staphylococci. Early prosthetic valve endocarditis, defined as endocarditis that develops within 6 months of valve surgery, is more likely to develop CEF than that related to infection with an endocarditis. Aortic valve infection and endocarditis is more likely to develop CEF than that related to infection with an endocarditis. Aortic valve infection and endocarditis is more likely to develop CEF than that related to infection with an endocarditis. Aortic valve infection and endocarditis is more likely to develop CEF than that related to infection with an endocarditis. Aortic valve infection and endocarditis is more likely to develop CEF than that related to infection with an endocarditis.

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Intracranial mycotic aneurysms (ICMA) may heal with medical therapy.

Resonance Angiography are useful in detecting these lesions but con- 

ventional four-vessel angiography still remains the diagnostic test of 

choice in such patients as anticoagulation can be avoided.

is highly variable.

Infective Endocarditis. Those patients whose symptoms reduce either with 

or 6-mm VAO), respectively. The punch hole is blocked with the left index 

to the inserts. The aortic site proposed for anastomosis 

VAO allows us to anastamose the proximal ends of the vein grafts, before 

the aortic intima in the suture. The ridge helps to prevent blood from spurting directly into the eye. The 

from the steel rod. There are 3 equidistant grooves in the inserting end 

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MANAGEMENT IN ADULT - INFECTIVE ENDOCARDITIS

Infective Endocarditis, an infection of the inner walls of the cardiac chambers, is a significant health concern. For bacterial endocarditis to occur, there should be bacteremia, damaged valves, or other cardiac structures that are secondarily infected. Organisms are introduced into the bloodstream and are protected from host defenses within the vegetation. Damage to the valve leaflet or chordae tendineae may be associated with infective endocarditis.

Symptoms and Signs
- Signs of bacteremia: Fever, chills, and sweats
- Corectral symptoms: Headache, myalgia, arthralgia
- Symptoms of valve damage: Dyspnea, syncope, auscultation of murmurs

Diagnosis
- Clinical history and physical examination
- Echocardiography
- Blood cultures

Treatment
- Antimicrobial therapy
- Valve replacement surgery

Factors Associated with Infective Endocarditis
- Intravenous drug abuse
- Trauma
- Intravenous drug use

Prognosis
- Mortality rates range from 10% to 20%.

Prevention
- Intravenous drug abusers should be screened for endocarditis.
- Infection control measures should be implemented.

References

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