

The primary aim of my trip to India was gaining some medical work experience at a well renowned hospital in Chennai. With an ambition of wanting to become a surgeon I undertook some work experience at the cardiac surgery department at the Madras Medical Mission hospital. In addition to the medical side of my stay in India, I also wanted to get involved with other things, which included visiting an orphanage and exploring the culture.

Madras medical Mission Hospital:

During my stay I was shadowing a senior consultant cardiac surgeon in the theatres. My time was mostly spent in the theatres observing the various procedures he carried out, which included coronary artery bypass grafts (CABGs) and heart valve replacements. I was also able to get an insight into post-operative care when I accompanied the surgeon in his ward rounds at the intensive care unit post-surgery.

I managed to learn many concepts relating to cardiac surgery and understood the importance of each step in each of the procedures. The following is a brief summary of the procedures I observed and what they entail:

Coronary Artery Bypass Graft:

A CABG is used only for multi-vessel diseases. During this procedure, the blockage is bypassed and vessels are grafted with a different artery. For example, the Left Internal Thoracic Artery can be grafted to the coronary artery bypassing the blocked region of the coronary artery. Refer to Fig.1.

I was most fascinated when seeing the cardiothoracic surgeon performing an anastomosis of the LIMA to the LAD to bypass a narrowing in the LMCA (left main coronary artery). I learnt that the anastomosis is the most important step of the surgery and requires utmost concentration and skill. If not done correctly, it would block the coronary artery leading to MI. I was particularly intrigued by the fact that he performed this anastomosis and the rest of the surgery on a beating heart. The LAD is the most important of the coronary arteries since it supplies the septum and anterior wall of the heart, which are needed for ventricular systole.

In India, most surgeons prefer to anastomose on a beating heart since it reduces the risk of complications once the heart is restarted. In addition, anastomosis on a beating heart is easier due to the contrast of vessels (since blood would be flowing through these vessels).

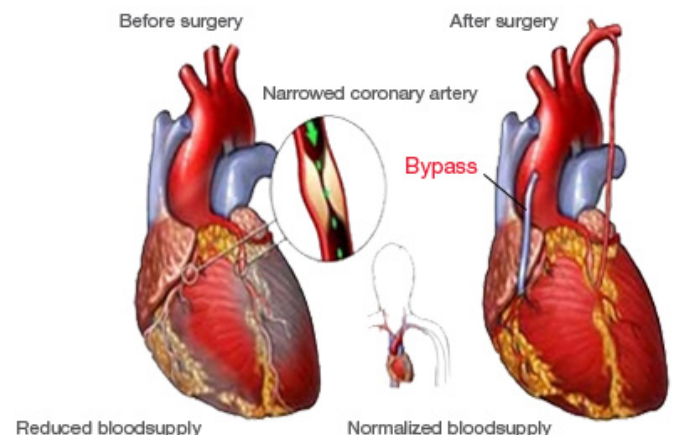


Fig.1. Image to depict the anatomy of the heart/ vessels in a CABG [1]

Valve Replacement:

Another case I observed at the cardiac theatres was a double-valve replacement of the aortic and mitral valves. The patient was suffering from rheumatic heart disease. This is where the heart width had expanded by greater than 50% of its normal size. Mitral regurgitation had caused cardiac hypertrophy (expansion). The anaesthetist explained that there exists two types of valve failures: regurgitation and stenosis (where atria expand). Valve replacements however require the heart to be stopped completely and thus the use of a heart-lung machine. The defective valve cusps are removed and an artificial valve is stitched in place using surgical sutures. Steel wires are then used to close up the thorax.

The heart-lung machine (cardiopulmonary bypass): Both the patient's circulation and breathing mechanisms are overtaken by the machine during the operation. A cannula is inserted in the venous end (vena cava) of the heart and the arterial end (aorta) connected back to the machine. The machine pumps oxygen. The heart is arrested by injecting a potassium rich solution, which arrests heart's diastole. This is known as cardioplegia. The blood vessels are clamped to prevent blood flow into the heart. When unclamped, the heart is restarted when the blood enters and washes the potassium away. However, there are complications of stopping the heart. On restart, it may go into arrhythmia and some vessels may go into spasms so it is important for the anaesthetist and surgeons to monitor the patients vitals carefully during the operation. Another key point is that the patient is injected with heparin for anticoagulation during surgery.

Cath-Labs:

On one of the days I was privileged to be in the 'Cath-Labs', where I observed angiograms and coronary angioplasty being carried out. An angiogram is a diagnostic procedure to identify any blockages in the coronary vessels. A guide wire is inserted into the femoral artery and a catheter is inserted along with it. The guide wire is removed and the catheter is directed to the coronary ostia where a radio-opaque dye is injected. A live x-ray surrounding the patient visualises the radio-opaque fluid flowing through the coronary vessels and identifies any blocks. At the same time, if the blockages are found to be significant a balloon angioplasty with a stent can be used to open out the narrowing and improve blood flow to the heart reducing angina. In this procedure a balloon is attached to the end of a catheter, which is inserted

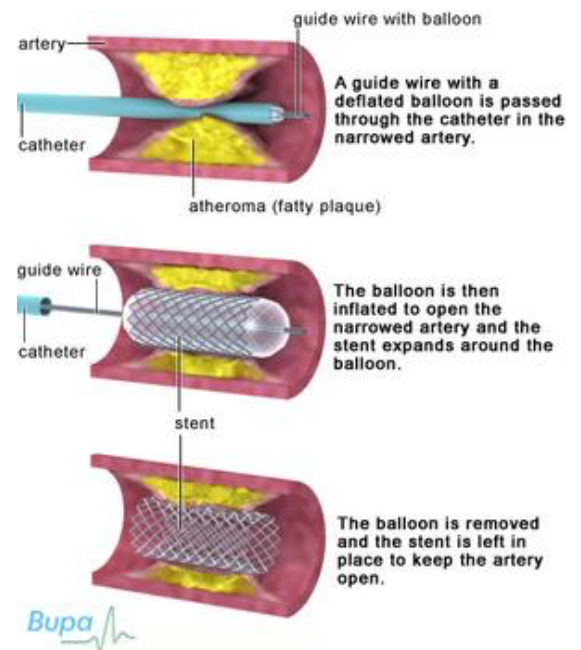


Fig.2. This shows how a stent and balloon angioplasty work to remove the narrowing in a blood vessel. [2]

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via the femoral artery. It is then guided to the blocked region of the CA and the balloon is inflated, which opens out the blockage; the catheter is removed.

Moreover, I understood how pacemakers are implanted and how they work. They are inserted at the cath-lab and are used to combat bradyarrhythmia. The pacemaker lead goes into the cavities of the left/right ventricles whilst the device itself goes under the skin on the right hand side of the chest. It generates a pulse to stimulate / aid the beating of the heart. An average pacemaker has an 8 year lifespan.

Non-medical experience

Orphanage: Near the end of my stay in Chennai, India, I paid a visit to an orphanage in a little village called Pozhichalur. I was privileged to meet the 30 odd children, ranging from 5 to 12 year olds, that were living there. I was astonished to see how the children were doing everything for themselves and helping the staff in cooking, washing and cleaning around the orphanage. I came to learn that all the children went to a local government school to which they go themselves. I hope to visit the orphanage during my next visit to India and perhaps help out with something more significant.

Cultural and Religious festivals: This was another key component to my stay in India. South India, especially the state of Tamil Nadu, is well renowned for its historic temples and the cultural hindu festivals. That particular month was quite special in the tamil calendar being important for one of the hindu gods. I particular enjoyed the festivals related to this and paying a visit to many temples in Chennai.

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