MINIMALLY INVASIVE CARDIAC SURGERY

Dr Alla Gopala Krishna Gokhale M.Ch, DNB

Surgery to treat some diseases in humans is known for centuries. However heart surgery took a long time to start in-view of the essential nature of the heart function for survival and narrow safety margin involved with heart surgery. After artificial heart-lung machine has been invented in 1953, the science of open heart surgery has developed enormously making it very safe and effective. However standard heart surgery typically requires exposure of the heart and its vessels through a skin incision of 10-12" and median sternotomy (dividing the breastbone-figure1), considered one of the most invasive and traumatic aspects of open-chest surgery. This results in prolonged stay in hospital (5-10 days in general) and requires 8-12 weeks before they can return to their normal activites.

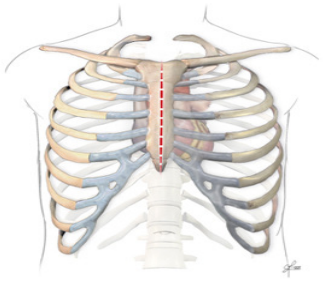

Figure1

Moreover artificial heart-lung machine is used routinely in all patients going for coronary artery bypass surgery (CABG- surgery done to increase blood supply to heart when it's blood vessels are blocked). This machine can cause damage to blood resulting in bleeding problems, brain strokes, more blood transfusions and infections.

To overcome some of these problems, minimally invasive operations on heart are getting popular in the last few years. A minimally invasive approach allows one or more combinations of the following:

1. Access to the heart through small incisions splitting only small part of the breast bone or through the spaces in the rib cage without splitting breast bone
2. Surgery on heart without stopping the heart.
3. Making use of technology like videothoracoscope or robots to do key hole surgery.

Beating Heart Bypass Surgery (figure-2)

Coronary arteries are 1.5 to 2.5mm in diameter. When heart is beating, it is difficult to do surgery on such small blood vessels. Traditionally, bypass surgery is done after heart is stopped. During this time, blood is circulated using an artificial heart-lung machine. Now with the advent of newer devices, it is possible to do coronary artery bypass surgery without stopping heart. What method suits will be decided by surgeon in the operating room. This results in less bleeding problems, less blood transfusions and likely to have less complications like kidney failure and strokes.

Figure-2

Small incisions: Operations through small incisions (2-3") reduce length of hospital stay to 2-3 days and they can resume their normal activites in 2-3 weeks. These result in less pain; less bleeding, lower infection rates and they are cosmetically attractive. Some of them are:

Endoscopic vein harvesting:

During coronary artery bypass surgeries a vein is taken from one of the legs to use during surgery. Traditionally, vein harvesting is accomplished through a lengthy surgical incision in the leg (see figure 3). But in recent times leading Surgeons have been practicing a minimally invasive procedure called Endoscopic Vein Harvesting (see figure 4). With this leg complications are minimized- especially useful in obese patients, diabetics and women.

Figure 3

Figure 4

CABG surgeries:

Today some of the patients undergoing bypass surgery can be offered this surgery through small incisions. Instead of traditional breast bone splitting surgery, if patient requires only one or two bypass grafts, this can be done through a small incision in rib cage (figure 5 & 6).

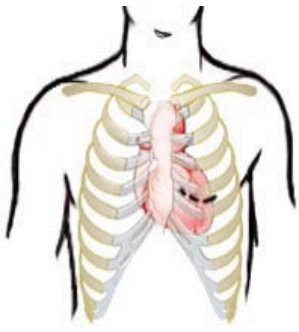

Figure 5

Figure6

Valve (and some congenital) surgeries:

There are 4 valves in heart which ensure smooth blood flow from one chamber to another chamber and that too only in forward direction. Some times they get diseased – resulting in either the narrowing of the valve causing obstruction to forward flow or the leakage of valve leading to the blood flowing in the reverse direction also. Commonly, valves on the left side (the mitral valve between the left upper and lower chambers, and the aortic valve between the left lower chamber and the aorta) are affected. Traditionally they are repaired or replaced via the midline breast bone splitting incision. Nowadays many of these can be operated using small incisions on the side of chest (figure 7) or splitting only part of the breast bone (figure 8) to fasten their recovery.

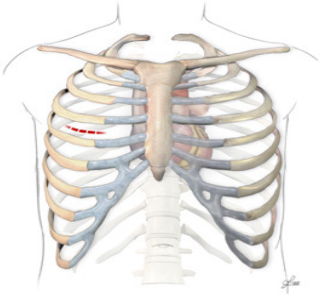

Figure 7

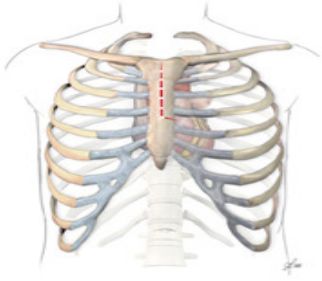

Figure8

Robotic and video thoracoscopy assisted heart surgeries:

In a few selected centers around world, some of the surgeries on heart can be done through key holes using technology like video-thoracoscopy and robotics. Mitral valve surgery can be done using a 4 cm incision on the side of chest with their help. In a select few centers around world, coronary artery bypass surgeries are being attempted totally thorough key holes.

In the coming decade, cardiothoracic surgery is likely to undergo major shift towards minimally invasive surgery where patients can be discharged in 2-3 days time and can go back to work in 2 weeks time.

For more information about heart Surgeries and prevention of heart diseases visit
Web site: www.drgokhale.com, www.drgokhalectassociates.in

Or contact
Email:drgokhale@drgokhale.com
Phone Off 040 2324 4444 ext 725, 9603040506, 9391029810

Dr Alla Gopala Krishna Gokhale