Robotic coronary artery bypass graft surgery

Background

Coronary artery bypass graft surgery (CABG) is a surgical procedure that improves blood flow to the heart for patients with blocked coronary arteries. Robotic CABG is a relatively new minimally invasive surgical technique. It is a less invasive alternative to conventional open heart surgery where the breastbone, or sternum, is sawn in half. It uses surgical instruments and a camera attached to the arms of a robotic machine, which are controlled by the heart surgeon via a computer console. This minimally invasive technique enables very precise control of the surgical instruments over a wide range of motion through small cuts on the side of the chest.

Indications

Robotic CABG surgery has been performed by specialized heart surgeons in selected institutions over the last 15 years. Whether a patient is suitable for robotic CABG or a conventional technique such as open surgery depends on several factors. These include the severity and anatomy of coronary artery disease, previous surgical procedures, other medical conditions, as well as the level of expertise and experience of the surgeon.

Technique

After administration of a general anaesthetic, three small incisions are made on the left side of the chest wall. Thin surgical instruments with robotic arms and a specialized camera attached to the robotic machine are then placed through these incisions. The surgeon performs the operation by controlling these instruments and the camera via a specialized computer console, where he or she is provided with a clear, three-dimensional view of the surgical field within the chest. In almost all robotic CABG procedures, an artery in the chest called the left internal mammary artery is 'harvested' using the robotic arms. This artery is then connected to the blocked coronary artery either through the incisions already in place or through a small separate incision on the front of the chest. Once the operation is completed, the surgeon removes the instruments and closes the incisions.

Benefits

In addition to improved precision and range of motion of the surgical instruments, the robotically-assisted approach carries a number of other potential benefits compared to more invasive conventional techniques. These include the use of smaller incisions, resulting in less scarring and an improved cosmetic outcome, as well as less surgical trauma, reduced pain and a decreased need for pain-relieving medications following the operation. There are also reduced risks of surgical complications, such as infection and bleeding. Furthermore, robotically-assisted CABG surgery may result in a reduced length of stay in hospital and faster return to work and activities of daily living.

Risks

Despite the numerous advantages of the robotic technique, there are still risks that need to be considered, relating to both the specific operation and the use of a general anaesthetic. These include small risks of bleeding, wound infection, abnormal heart rhythms, heart attack, stroke and death as well as the need for conversion to an open operation or a further operation in the future. These risks vary between individuals based on the severity of the underlying disease and the presence of other conditions. As always, the risks should be weighed against the benefits and discussed with your surgeon.

For more information, please visit the following websites:

https://my.clevelandclinic.org/services/heart/services/robotically-assisted-heart-surgery

http://www.mayoclinic.org/tests-procedures/robotic-surgery/basics/definition/prc-20013988

http://sydneyheartandlung.com.au/surgery/minimally-invasive-surgery/minimally-invasive-coronary-artery-bypass-grafting/

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