

Robot lends hand in cardiac bypass surgery

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(PhysOrg.com) -- Two cardiothoracic surgeons at UC Davis Medical Center have performed the first robotic-assisted, multi-arterial, cardiac bypass procedure in California. The surgery, which took place in late January, is a highly complex but minimally invasive operation that offers patients quicker recovery times and less blood loss than conventional open-heart bypass procedures.

The successful case, which involved a 49-year-old patient suffering from multi-vessel <u>coronary artery disease</u>, was also unique because it combined a robotic-assisted bypass with an arterial stent that opened the one secondary clogged vessel that could not be reached during surgery because of its position behind the heart. This highly effective combination of procedures is available at only a handful of hospitals in the nation.

"These hybrid procedures provide the best of what traditional cardiac surgery and interventional cardiovascular procedures offer patients," said Charles Whitcomb, associate professor of cardiovascular medicine, who collaborated on the case with surgeons W. Douglas Boyd and Jerry W. Pratt. "A patient can have the durability of bypass surgery with the ease and safety of a coronary stent." A stent is a tiny mesh tube that fortifies the blood vessel wall, helping to keep it open and allow blood to flow freely.

Robotic-assisted heart surgery allows surgeons to use a specially designed computer console to control the movement of surgical instruments that are attached to several thin robotic arms. UC Davis



specialists have been using robotic-assisted equipment for more than five years, mainly in urologic, gastrointestinal and gynecologic-oncology cases.

In contrast to conventional heart surgery, which requires a patient's chest to be opened at the sternum, an arterial bypass using the <u>robotic device</u> only requires tiny incisions between the ribcage. By guiding the computer-controlled surgical instruments, the surgeon can make highly precise movements while working within a very small area around the heart.

"Our patient received all of the benefits of conventional open-heart surgery with all the recovery benefits of a minimally invasive procedure," said Boyd, a professor of cardiothoracic surgery with more than a decade of experience in robotic-assisted procedures. "Research shows that this type of surgery improves long-term survival without any of the downsides that come from having to crack the sternum and open up the chest. Patients can be back on their feet within weeks rather than months because muscle heals more quickly than bone."

Boyd, who completed the world's first closed-chest, beating-heart coronary artery bypass using a robotic system more than a decade ago, noted that UC Davis' first case did not require the use of a heart-lung machine, as it normally is during conventional bypass surgery.

"Because we didn't have to stop the heart to operate, the patient didn't need a blood transfusion," said Boyd. "One of the risks of a conventional bypass surgery is the need for a heart-lung machine, which can add to a patient's complications from increased swelling and blood loss. The robotic-assisted procedure offers patients the least traumatic <u>heart</u> <u>surgery</u> and the best long-term outcomes."

Robotic-assisted procedures represent the latest development in



minimally invasive surgical technology. During an operative procedure, the surgeon sits at a control console near the patient while another physician is at the patient's bedside. The lead surgeon works at the console, seeing the magnified operative field through a 3-D video monitor and manually controlling several robotic arms using hand-held devices that replicate the surgeon's every hand movement. The procedure uses several very small, keyhole-sized incisions through which a tiny camera and surgical instruments are placed. The small incisions help reduce the length of recovery time and speed up a patient's return to normal activities. There is generally less blood loss during robotic-assisted surgery, enabling patients to more quickly regain strength and stamina.

The robotic-assisted machine cannot be used for every coronary artery disease patient. Individuals are screened on a case-by-case basis and must meet specific criteria, such as having appropriate target vessels, to be considered appropriate candidates for the procedure.

"This case was exciting for us because as heart surgeons we still can't approach all vessels using minimally invasive techniques," said Pratt, an associate clinical professor of cardiothoracic surgery, who also has extensive experience in robotic-assisted procedures. "In terms of bypass surgery, the robotic-assisted approach is about as sophisticated as it gets. However, there are some vessels that remain ideal for stenting, which complements our work perfectly and represents a combination of stateof-the-art techniques that provide patients with complete revascularization."

Provided by UC Davis

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