Surgeon 'gluing' the breastbone together after open-heart surgery

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Dr. Paul Fedak from the University of Calgary Faculty of Medicine has developed an innovative method to repair the breastbone after it is intentionally broken to provide access to the heart during open-heart surgery. The technique uses a state-of-the-art adhesive that rapidly bonds to bone and accelerates the recovery process Credit: Paul Rotzinger

An innovative method is being used to repair the breastbone after it is intentionally broken to provide access to the heart during open-heart surgery. The technique uses a state-of-the-art adhesive that rapidly bonds to bone and accelerates the recovery process.

"We can now heal the breastbone in hours instead of weeks after open-heart surgery. Patients can make a full recovery after surgery and get back to full physical activities in days instead of months," reports Dr. Paul W.M. Fedak, MD PhD FRCSC, a cardiac surgeon at Foothills Medical Centre and scientist at the Faculty of Medicine who pioneered the new procedure.

Over 20 patients have received the new technique in Calgary as part of a pilot study. Fedak and Kathryn King, RN PhD are the co-principal investigators on the study. King, a cardiovascular nurse scientist, is an expert in post-operative recovery after open-heart surgery. "We know that recovery from sternotomy is a multi-faceted process that includes not only healing of the breastbone but the ability to return to normal activities," she says. "Being able to resume normal activities is a hallmark of a good recovery; this surgical innovation should enable that."

The patients report substantially less pain and discomfort after surgery and the use of strong pain medication, such as narcotics, is profoundly reduced if not completely eliminated with use of the procedure. The ability to deep breathe, known to play a key role in recovery, is also substantially improved.

Richard Cuming's chest was repaired in June Kryptonite adhesive, a biocompatible polymer (manufactured by Doctors Research Group Inc., (Connecticut USA). Two years earlier he had open-heart surgery repaired the traditional way - sewing his breastbone back together with wire. That wire broke, his breastbone opened, and Cuming had a difficult time.

"I couldn't accomplish simple tasks like squeezing toothpaste, turning the steering wheel in my car or pulling open a heavy door without discomfort and pain. Anytime I coughed or sneezed there was movement in my chest and significant pain, I think the worst part of the ordeal was

that I stopped doing things 'in case they would hurt'" says Cuming.

After his chest was 'glued' back together using Kryptonite adhesive and wires he had an entirely different experience. "I had a little bit of pain, but this was a walk in the park compared to my earlier recovery. I can do anything I could do prior to the original surgery. I feel wonderful."

The encouraging results of this pilot study have prompted the Calgary researchers to establish a worldwide study to further investigate its benefits. The STICK Trial (STernal Innovative Closure with Kryptonite) aims to apply the technique in over 500 patients across the globe over the next 12 - 24 months.

"We are proud of the innovative work being done at Foothills Medical Centre," says Dr. L. Brent Mitchell, Director of the Libin Cardiovascular Institute of Alberta and Head of the Clinical Department of Cardiac Sciences at Alberta Health Services, "I used to warn my open-heart surgery patients that they would feel like they had been hit by a truck during a long recovery period; I'm glad I don't have to say that anymore."

More than one million open-heart surgeries are performed in the world each year by splitting the breastbone. Until this recent discovery, wire closure of the breastbone had been standard practice since routine heart surgery was established a half century ago.

The investigators believe that this improved method of chest closure will become a new standard of care for patients undergoing open-heart surgery. Fedak has started training surgeons in other Canadian and European hospitals where it is rapidly gaining popularity.

Source: University of Calgary (news : web)