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Commentary: Acellular porcine mesh for chest wall reconstruction

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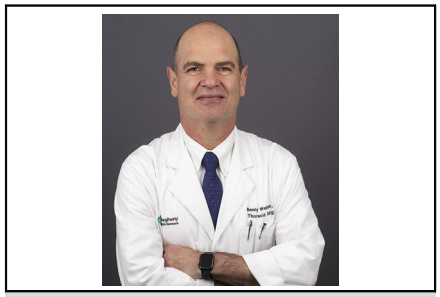

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CENTRAL MESSAGE

Acellular collagen matrix mesh offers good results in chest-wall reconstruction and should be part of the thoracic surgeon armamentarium when reconstructing the chest wall.

Since Parham's original report, chest-wall resection and reconstruction remains a complex procedure.[1] Functional goals include prevention of paradoxical motion, re-establishing chest-wall anatomy, preventing lung hernias, and maintaining stable respiratory function. Over the years, multiple different materials have been used. With excellent results, Dr Manjit Bains and the group at Memorial Sloan-Kettering pioneered the methyl methacrylate sandwich mesh for chest-wall reconstruction.[2] Others have used a range of different materials, including Gore-Tex, other types of meshes, and titanium struts.[3,4] More recently, several investigators have reported on the use of 3-dimensional (3D) printing to customize prostheses for chest-wall reconstruction.[5,6] Independently of the technique for reconstruction, chest-wall surgery remains a challenge for thoracic surgeons.

In the current issue *of JTCVS Techniques*, Gonfiotti and colleagues[7] present a multicenter Italian experience with chest-wall reconstruction using a porcine biological mesh. The mesh is an acellular collagen matrix derived from pig dermis and does not contain DNA. It is available commercially under the brand name Permacol (Medtronic). One hundred five patients had mesh placement for tumors, lung hernias, trauma, and infections. More than one half of the patients also had titanium struts for the reconstruction, and approximately 60% of the patients had myocutaneous flaps. Results were impressive, and only 1 patient required mesh removal and reinsertion (due to bleeding). However, as in many previous studies of chest-wall reconstruction, morbidity was greater than 30%. At 30 months's follow-up, there were no instances of mesh infection, despite nearly 40% of patients being at significant risk for infection.

A biological mesh is an attractive device for chest wall reconstruction, as it may decrease the incidence of mesh infection and removal. Gonfiotti and colleagues's complications rate appears similar or perhaps a bit lower than the previous series that used other prosthetic materials.[2] However, biological mesh alone does not provide rigidity, a characteristic often needed in chest-wall reconstruction. In many cases, Gonfiotti and colleagues used a combination of mesh and titanium struts to overcome the lack of rigidity. Both Permacol and titanium struts are very expensive, and the combined cost is not insignificant. I wonder if one needs a biological mesh when the plan is to reconstruct with titanium struts and a myocutaneous flap. Having done it in the past, I suspect the answer is no.

Gonfiotti and colleagues's results justify adding Permacol to the surgical armamentarium when there is a need for reconstruction of the chest wall. However, the rapid evolution of 3D printing and advanced materials such as surgical-grade solid silicone[5] and polyetheretherketone,[8]

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which can be used for a rigid and precise reconstruction, will transform the way we reconstruct the chest wall. 3D printing will likely be used for elective cases such as chest-wall tumors. Even with the 3D printing revolution, I believe there will always be room for devices such as that described by Gonfiotti and colleagues, primarily in acute cases in which 3D could not produce a prosthesis in a timely fashion. Until 3D printing and advanced materials become popular, affordable, and widely available, surgeons will have to mix and match the several available options for reconstructing the chest wall, often following their personal preference.

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