BioSurgical Technology for Incisional Hernia Repair: Use of Tutopatch™ and Tutomesh™ Bovine Pericardium for Complicated Hernias

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Introduction
Hernia repair is one of the world’s most common procedures, and accounts for more than 1 million operations performed in the United States each year. For years, surgeons have relied on using mesh produced from various types of material to provide reinforcement and prevent hernia recurrence. Synthetic mesh has been shown to reduce the risk for recurrence, but is contraindicated in a contaminated field. Furthermore, surgeons have discovered that synthetic mesh can shrink or migrate, in turn compromising the repair and causing chronic inflammation. This often leads to quality of life–inhibiting patient discomfort and pain.

Biologic meshes were developed to satisfy the demand for a material that could avoid complications typically associated with synthetic mesh. Biologic meshes—which function by providing a scaffold into which the patient’s tissue remodels, with the mesh itself being gradually remodeled—come from a variety of sources, such as processed human dermis, porcine dermis and submucosa, and bovine pericardium. The characteristics of each mesh hinge on its material properties and method of processing: Non–cross-linked grafts comprised of bovine pericardium, human dermis, and porcine dermis have been shown to revascularize and remodel, whereas cross-linked mesh may become rigid with calcification that inhibits remodeling.

Tutopatch™ and Tutomesh™ Implants
Derived from bovine pericardium, Tutopatch and Tutomesh grafts (RTI Biologics) are non–cross-linked, acellular, collagen matrices indicated for the reinforcement of soft tissue where weakness exists in general and plastic surgery repair. Obtained only from bovine spongiform encephalopathy (BSE)–free countries, the raw materials undergo the Tutoplast® company’s processing of this initial allograft biologic did not address that concern, although I understand that new processing techniques from other companies have emerged that mitigate this issue. The bovine pericardium performs significantly better in my experience than the initial allograft biologic AlloDerm, “ Dr. Lo Menzo said. “Another reason I switched to a bovine pericardium product is cost and then, a third reason is size.” While there are larger allograft biologic meshes that have been made available more recently, Dr. Lo Menzo noted that he continues to use bovine pericardium products as “mesh derived from bovine pericardium is easy to store on the shelf and does not need much preparation.”

The Repair
In an ideal ventral hernia repair, Dr. Lo Menzo said that his goal is to reconstruct the abdominal wall as well as possible and use mesh only as reinforcement. “If possible, I try to close the defect primarily, adding the mesh either intraabdominally or in the retro muscular layer. Less ideal would be to place the mesh in an onlay position, but sometimes that is the only way,” he said. Dr. Nocca stated that he first sees the abdominal cavity and abdominal wall to achieve clear exposure of the ventral hernia. “Then, when you use the Tutomesh implants, you have to place it on a platform of tissue—and that tissue may be muscle or may be aponeurosis—that will facilitate the colonization of the mesh,” Dr. Nocca said. “You close the hole created by the ventral hernia, then reinforce with the biomaterial that will change in time to become a new tissue.”

Due to the complex nature of the patients’ hernias, the recurrence rate Dr. Lo Menzo finds in patients who receive a biologic mesh is substantially higher than the approximately 2% he sees in low-risk patients who receive a synthetic mesh for common hernias. “Our recurrence rate is sometimes 15% or 20%, but that’s acceptable in the particular patient population who undergo complicated repairs,” he said. “We do see a number of wound breakdowns that are not related to the biologic mesh itself, but to the complexity of the construction that goes along with placing the mesh.”

Dr. Nocca will soon publish the results of an international trial he and his colleagues conducted of complicated ventral hernia repair with or without Tutomesh implants. In this study, the first randomized trial to compare the use of a...
The role of biomaterial meshes in the management of ventral hernia remains to be elucidated. This case study presents an experience in the repair of recurrent ventral and incisional hernias using a bovine pericardium mesh under laparotomy. In 2010, a 61-year-old woman (body mass index 40 kg/m²) presented with a ventral and incisional hernia 3 cm above the umbilicus. Physicians at the University Hospital of Montpellier had treated this hernia 2 years ago by laparoscopic approach (synthetic mesh 10 × 10 cm by inlay technique). In 2012, the patient returned to the hospital and complained about pain and digestive disorders. Computed tomography scan showed shrinkage of the mesh that led to recurrence of the hernia.

Repair of the recurrent ventral hernia using a Tutomesh implant was initiated. The procedure was completed entirely using the laparotomy approach. The contents of the hernial sacs were incarcerated omentum and small bowel. The first step of the procedure was to remove the previous synthetic mesh after a large adhesiolysis. The size of the defect through which incarceration occurred was 5 cm. An inadvertent enterotomy occurred in this case during bowel reduction and adhesiolysis; the operating physicians decided to choose a biomaterial prosthesis in order to decrease the potential risk for mesh infection, and selected a 12 × 16 cm Tutomesh prosthesis. Tutomesh is a xenogenic, non–cross-linked, collagenous graft of bovine origin, which consists predominantly of collagen type I and is fenestrated in a regular pattern (Figure 1).

A sublay technique was used to fix the mesh to the abdominal wall (Figure 2). Overall operative time was 96 minutes. The patient’s postoperative hospital length of stay was 4 days, and no postoperative complications were noted at 1-, 12-, and 24-month follow-ups. The advantages of using the Tutomesh prosthesis were that it was native bovine collagen with nearly unchanged biomechanical properties; histocompatibility; its resistance to bacterial colonization and chronic infection; and its bioactivity, noncarcinogenicity, and minimal allergy concerns. The mesh also featured high tensile strength and facilitated tissue regeneration (absorbable mesh). Also, the mesh perforations prevented the formation of seromas and provided excellent adaptability to the anatomy. This case illustrates that mesh consisting of biomaterial may be an efficient and safe option for treating ventral abdominal wall hernias. Randomized trials are needed to evaluate this treatment further.

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References

Disclosures
Dr. Lo Menzo reported no relevant financial conflicts of interest. Dr. Nocca reported receiving honoraria from Covidien and Ethicon and grant/research funding from Cook Medical, Ethicon, Novartis, Tutogen, and Wahltec.

Call 877-612-4287 to coordinate product availability with your local representative. We look forward to seeing you at our booth and symposia at AHS in Orlando, Florida on Wednesday, March 13, 2013 beginning at 12 p.m.

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