CASE STUDY

Hernia Repair by Minimally Invasive Component Separation Reinforced with SurgiMend
Surgeon Profile

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Dr. Hsiao completed his undergraduate studies at the University of Michigan, Ann Arbor; and received his medical degree from Indiana University School of Medicine. Dr. Hsiao's post-graduate training includes general surgery at the Phoenix Integrated Surgical Residency, Plastic & Reconstructive surgery fellowship at the University of Louisville, and Hand surgery fellowship at Washington University in St. Louis under world renowned peripheral nerve surgeon Dr. Susan Mackinnon, M.D. Dr. Hsiao has earned several honors and distinctions and is a LEEDS Scholar. He has given numerous grand round presentations and was actively involved in multiple research projects at Eli Lilly, the University of Michigan, the University of Louisville, and at Washington University in St. Louis.

Dr. Hsiao provides services in all aspects of plastic surgery including breast reconstruction, head and neck reconstruction, general hand surgery, and peripheral nerve surgery and more.4

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Patient Presentation:
A 62 year old female patient presented with a ventral incisional hernia. The patient had a history that included an exploratory laparotomy, a superior mesenteric endarterectomy and thrombectomy, bowel adhesiolysis, and an enterotomy repair. An abdominal exam noted a well healed midline scar from xiphoid to pubis (Figure 1). Above the umbilicus a reducible hernia was palpable with a fascial defect measuring 10cm wide. The patient was not a smoker, but had a history of atrial fibrillation that required anticoagulation with warfarin and rate control with digoxin.

Discussion Of Treatment Options
Due to the size of the hernia and contraction of the muscle, the patient was counseled that a component separation would be needed to approximate the fascial edges. The alternative would be a bridging hernia repair with a synthetic mesh. Synthetic mesh is susceptible to infections that require reoperation and removal of the implant. Therefore a component separation reinforced with a biologic mesh was recommended to the patient to allow approximation of the fascial edges and minimize the risk of a recurrent hernia. Additionally, a minimally invasive approach to the component separation was recommended to preserve the rectus perforators to the abdominal wall and maximize vascularity to the skin and subcutaneous tissues at the incision site. Recent studies have suggested this procedure minimizes the development of wound healing problems.1,2

Figure 1. Patient abdomen with midline scar and palpable hernia superior to the umbilicus.
Surgical Procedure

Under general anesthesia, adhesions between segments of the bowel and the abdominal wall were lysed and the hernia was reduced by general surgery (Figure 2A). The fascial edges were grasped with Lahey clamps. The skin and subcutaneous tissues were elevated up to the medial row of rectus perforators. Manual palpation of the posterior surface of the abdominal wall assisted in determining the lateral border of the rectus abdominus muscle (Figure 2B). Two transverse incisions of 3 cm in width were made in the mid-abdomen over the lateral border of the right and left rectus abdominus muscle (Figure 2C). A narrow lighted retractor was inserted into the wound and the skin and subcutaneous tissues were elevated off of the fascia. Under direct visualization the external oblique fascia was incised from the costal margin to below the umbilicus. The external oblique fascia was then elevated off of the internal oblique muscle/fascia toward the posterior axillary line. This allowed advancement of the rectus abdominus, internal oblique, transversalis fascio-myocutaneous unit towards the midline. The procedure was repeated on the contralateral side. Fascial re-approximation could now be obtained at the midline which was repaired with 1-0 prolene suture (Figure 3A).

SurgiMend 3.0 (10 x 15 cm) was hydrated in a basin of room temperature, sterile saline and trimmed to fit on top of the rectus fascia from the right and left medial row of perforators to above and below the repaired fascial defect. SurgiMend was secured to the intact anterior abdominal wall fascia (Figure 3B) with interrupted horizontal mattress, zero PDS sutures. A total of four, 15 French Blake drains were placed prior to skin closure. Drains were placed in each donor site and brought out inferiorly. Two drains were placed into the midline wound and brought out inferiorly. Both the donor site incisions and midline incisions were then closed. Scarpa’s fascia and subcutaneous tissues were closed with 2.0 Vicryl suture while deep dermis was closed with poly-lactic acid/poly-glycolic acid degradable staples. The skin was closed with running subcuticular 4-0 Monocryl suture. Immediately post-procedure analgesia was administered via a transverse abdominus plate (TAP) block.
Clinical Outcome
The patient was admitted to the hospital ward awaiting return of bowel function and pain control. She was discharged home on oral pain medications three days after the procedure. Prophylactic antibiotics (Cefazolin) were given just prior to induction of anesthesia, and maintained for the duration of the hospital stay. Drains were removed post-operatively when output was less than 30cc in a 24 hour period. At 6 months post-op, the patient shows no evidence of recurrence.

Discussion
Synthetic mesh is frequently used during repair of ventral incisional hernias, but when surgical site infections develop, patients are subjected to prolonged wound care and an increased incidence of recurrent hernia formation requiring further surgical intervention. Component separation allows direct approximation of the fascial edges, and can be combined with SurgiMend to reduce the incidence of recurrent hernia formation.3

Standard open component separation results in division of the rectus perforators to the anterior abdominal wall. This can result in soft tissue necrosis at the incision site resulting in additional long-term wound care. Minimally invasive component separation does not divide the rectus perforators, and maintains maximal perfusion of the skin and subcutaneous tissues at the incision.

Additional benefits of minimally invasive component separation include procedural cost savings compared to laparoscopic component separation because the surgery can be completed without the use of disposable laparoscopic equipment, for example, ports and dissecting balloons.

REFERENCES
SurgiMend Collagen Matrix for Soft Tissue Reconstruction
is part of a family of soft tissue repair products

Description
SurgiMend is an acellular dermal tissue derived from bovine dermis. The device is supplied sterile in a variety of sizes, shapes, and thicknesses to be trimmed by the physician to meet the individual patient’s needs.

Indications
SurgiMend is intended for implantation to reinforce soft tissue where weakness exists and for surgical repair of damaged or ruptured soft tissue membranes.

SurgiMend is specifically indicated for:
• Plastic and reconstructive surgery
• Muscle flap reinforcement
• Hernia repair including abdominal, inguinal, femoral, diaphragmatic, scrotal, umbilical, and incisional hernias.

Contraindications
• SurgiMend is not designed, sold, or intended for use except as indicated.
• SurgiMend should not be used for patients with a known history of hypersensitivity to collagen or bovine products.

Warnings and Precautions
CAUTION: Federal law (USA) restricts this device to sale by or on the order of a physician.
• Consider the loading environment when selecting the product thickness; thicker product tends to have greater initial strength.
• Fenestrated product will stretch more than non-fenestrated product.
• Meshing of fenestrated product is not recommended.
• Do not expose to chemicals or substances other than sterile, room temperature 0.9% saline.
• Excessive heat can damage collagen. Do not hydrate in 0.9% saline warmed above room temperature. If, when hydrated, the product shrinks in size, DO NOT use the product as it may be damaged.
• SurgiMend should be used with caution where any pre-existing pathology may limit blood supply and compromise healing.
• SurgiMend should be used with caution in surgical locations where the product may be exposed to stomach and/or intestinal contents. Collagen-based implants can be susceptible to degradation by digestive enzymes and conditions of acidic (low) pH.
• Do not resterilize as this may damage SurgiMend.
• SurgiMend is for single patient use only and is to be implanted surgically.
• SurgiMend has not been evaluated in pregnant women.
• The patient’s medical condition may adversely impact healing of the deficient tissue. These conditions may include, but are not limited to: smoking, diabetes, insufficient blood supply at the implant site, and exposure of the implant site to radiotherapy.
• Do not use product past the date of expiration.

Potential Complications
General risks may include, but are not limited to: infection, allergic reactions, pain, swelling or bruising, foreign body reactions, acute or chronic inflammatory reactions, adhesions, seromas, hematomas, and repair laxity. The patient should be made aware of these risks and others associated with general surgery and the use of anesthesia.

PHYSICIAN NOTE: The physician must convey the indications, contraindications, warnings and precautions, and potential complications given in this document to the patient.