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Defining surgical outcomes and quality of life in massive ventral hernia repair: an international multicenter prospective study

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Abstract

BACKGROUND: Our goal was to set criteria for massive ventral hernia and to compare surgical outcomes and quality of life after ventral hernia repair (VHR).

METHODS: The International Hernia Mesh Registry was queried for patients undergoing VHR from 2007 to 2013. Defect was categorized as massive if the width or length was greater than 15 cm or area greater than 150 cm^2. Massive VHR was compared to regular VHR.

RESULTS: A total of 878 patients underwent VHR: 436 open, 442 laparoscopic with 13 deaths (1.5%) and 45 hernia recurrences (5.1%). Of those, 158 patients (18%) met criteria for massive VHR. Massive VHR patients had longer length of stay (LOS) and operative time and more hematomas, wound infections, wound complications, and pneumonias ($P < .05$). On multivariate analysis, LOS was longer, and early postoperative pain and activity limitation were greater in massive VHRs ($P < .01$). Massive VHR in the laparoscopic approach resulted in greater long-term mesh sensation ($P < .01$).

CONCLUSIONS: VHR in massive hernias have increased rates of complications and longer LOS.

Ventral hernia repair (VHR) is one of the most common surgeries performed in the world and is one of the top 5 operations performed by graduating general surgery residents in the United States.[1] More than 300,000 VHRs are performed in Europe each year,[2] and 350,000 VHRs are performed in the United

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States,[3,4] which results in a greater than $3 billion dollar annual expenditure in the United States. According to the recent data from the Healthcare Cost and Utilization Nationwide Inpatient Sample, more than 70% of the repairs in the United States are performed via an open approach, and more than 85% are performed with mesh.[5] Many of these ventral hernias are recurrent or complex, and patients often present with very large hernia defects with loss of abdominal domain. It is a given that "massive ventral hernias" can be technically challenging and often require intricate surgical techniques, but currently there is a lack of standardization on their definition in the surgical literature.

A review of the hernia literature demonstrates that the term massive ventral and/or incisional hernia is often used synonymously with the loss of abdominal domain[6–11]; again, no standardized definition of the term exists. Many studies have examined the effect of defect size on patient outcomes and hernia recurrence,[12–17] although few studies have used size criteria for their analysis. Those few that have used a cutoff for maximum defect size have varied from 10[18–20] to 15 cm.[21,22] Indeed, Chevrel and Rath[21] and Korenkov et al[20] have classified 10-cm defects in the transverse dimension as "large" defects and recommend open repairs for this class of incisional hernia. Encouraged by these previous findings, last year our group was the 1st to examine the effect of large ventral hernias ($\geq$10-cm defect size in any dimension or area $\geq$100 cm^2) on operative outcomes and patient quality of life (QOL). Wormer et al[23] found that in addition to an increased risk of seroma formation, longer operative time, and length of stay (LOS), patients with large hernia defects had more early postoperative pain and activity limitation than those with smaller hernia defects.

However, when defining hernia size, a defect cutoff of 10 cm may not appropriately represent giant hernia defects. A more robust definition of 15 cm in either in the transverse or craniocaudal dimension has been proposed by Moreno-Egea et al[22] to correlate with 97.9% specificity for hernia recurrence at a 2-year follow-up. In addition, Chevrel and Rath found a 16% recurrence rate and a 93% rate of mesh use when the 15-cm criterion was used. Based on these studies and the lack of defining criteria for massive ventral hernia, the goal of this study was to define massive ventral hernia as 15 cm or more intraoperative defect size in any dimension or area 150 cm^2 or more, and validate it by comparing VHR patients' outcomes using an international, multicenter, prospectively collected database. In addition, secondary goals of the study were to analyze patients undergoing massive VHR and to examine the differences in outcomes by surgical approach to determine if there is an optimum or recommended method for repairing massive ventral hernias. The hypothesis of this study is that patients with massive ventral hernias, by the stated definition, will have increased rates of surgical complexity, higher rates of perioperative complications and recurrence, and reduced QOL postoperatively.

Methods

Patient population

This study is a secondary analysis of an international, multicenter hernia-specific database. The International Hernia Mesh Registry (IHMR) is a prospectively collected data set on consecutive inguinal, umbilical, and ventral hernias from 45 institutions located in 10 countries centered mostly in Europe and North America. Patient demographics, operative details, and outcomes data for these hernia repairs are entered into the IHMR by trained abstractors via a Web-based data collection tool. Patient inclusion and exclusion criteria are reported in Table 1 and are designed to target hernia patients and limit confounding variables such as chronic pain, current major illnesses, and psychosocial factors. The IHMR is funded by Ethicon, Inc (New Brunswick, NJ); however, all patient selection, operations, operative choices, and data analysis are performed

Table 1 IHMR patient population

Inclusion criteria	Exclusion criteria
Patients who • provide written informed consent • are $\geq$18 years old • can be either sex • receive a mesh prosthesis during hernia repair • agree to provide contact information • are literate • are able to understand the study questionnaire • agree to answer long-term outcomes data questions	Patients who • cannot give written informed consent • are <18 years old • have previously been entered into the registry • are suffering from or receiving medications for chronic pain • have pre-existing chronic depression • have a terminal illness (eg, cancer) • have an ongoing infection • are receiving a concomitant surgical procedure • have suspected EtOH or drug abuse • are receiving multiple hernia repairs using more than 1 mesh or device (however, this does not include bilateral inguinal/femoral hernias or suturing 2 meshes together for a large VHR) • are scheduled to receive both a synthetic and biologic mesh • are employees or have direct involvement with the registry, investigator, registry center, or Ethicon, Inc

EtOH = alcohol; IHMR = International Hernia Mesh Registry; VHR = ventral hernia repair.