



THE PREOPERATIVE EVALUATION OF VENTRAL HERNIAS

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Abstract:

Ventral hernias are one of the most common problems confronting general surgeons. Incisional hernia is a common long-term complication of abdominal surgery and is estimated to occur in 3% to 13% of laparotomy incisions. Because there is no prospective cohort available to determine the natural history of untreated ventral hernias, most surgeons recommend that these hernias should be repaired when discovered. So, there was a need to study the disease with respect to the various presentations, to gauge the awareness levels of the patients coming to us and also to determine the best modality of treatment.

Keywords: Ventral Hernia, Repair, investigations.

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Introduction:

Patients with ventral hernia usually report unspecific symptoms and occasionally experience pain especially around the protrusion with gastrointestinal problems, such as a postprandial feeling of fullness or constipation. Larger hernias may be associated with lesions of the skin overlying the hernia sac or with chronic spinal complaints. It is not uncommon that patients with IH experience social exclusion and are limited in their ability to work. In addition, self-care may be substantially impaired(1).

Patient may present with the most severe complication which may occur in the natural course of untreated ventral hernia (incarceration) which is estimated to affect 6 to 15% of cases(2).

Incisional hernias are often noticed as a protrusion of the abdominal wall at the site of the incision from previous abdominal surgery. This is typically more pronounced with increased intra-abdominal pressure. Symptoms can range from no symptoms to discomfort, pain, or symptoms of complications like bowel obstruction and or strangulation. In most people, hernias limit patients' physical activities either due to the associated symptoms or as a precaution to avoid worsening also patient may give history of constipation, respiratory disease like COPD, steroid therapy, BPH, history of lifting heavy weight, history of infection in the previous surgery wound or serosanguinous discharge on the early postoperative days through the main suture line(3).

Clinical examinations:

Inspection (There is bulge or swelling around the scar. The scar may be thin and evidence of secondary changes like ulceration or skin color changes may be present. Expansile impulse on cough and reducibility may be present. In cases of bowel obstruction duo to adhesions, the patient may also present with symptoms of abdominal distention, vomiting, and/or absolute constipation(4)

On palpation, a swelling is palpable at or near the site of the surgical incision, usually reducible (depending on its severity)(4). After reduction of the contents, in most of the cases, a defect can be palpated through the scar. Occasionally the edges of hernial defect can be felt and the size can be estimated (5)The characteristic clinical feature of an ventral hernia is a non-pulsatile, reducible, soft and non-tender swelling at or near the site of a previous surgical wound. If the hernia is incarcerated, it can become painful, tender, and erythematous. Assessment of the patient for any signs of bowel ischemia (strangulation), such as tenderness, rebound tenderness or involuntary guarding(4).

Percussion: Percussion guides us to assess whether the content of the hernia sac is solid, liquid or gas(4).

Auscultation: If the content of the sac is bowel loop, a peristaltic bowel sound may be heard and confirm the content of sac as bowel loop(4).

Occasionally small IH is identified intra-operatively when the patients undergo another abdominal surgery. Incisions made at the same scar site or laparoscopic approach may show the fascial defects with occasional fat incarceration(6).

BASICS OF DIAGNOSTIC TESTING

In addition to a detailed history and physical exam, several imaging studies are useful for the detection and specifying of hernia defects, and frequently, more than a single study will be required. Ultrasound (US) has the advantages of being dynamic, in that the patient can be positioned either prone or supine, and that images can be obtained both while at rest and while performing a Valsalva maneuver.(7)

It also avoids harmful radiation and can potentially be performed in the surgeon's office. However, ultrasound is very operator dependent. Computed tomography (CT) is commonly used in the identification and characterization of ventral hernias. It is rapid, and most surgeons are comfortable with interpreting the images obtained. CT is limited, in that the patient must be positioned either supine, or occasionally prone, which may lead to spontaneous reduction and lack of detection of small or easily reducible hernias. Exposure to harmful radiation may also be of concern in patients undergoing repeated evaluations. Magnetic resonance imaging (MRI) avoids the use of such radiation and gives excellent delineation of subtle tissue planes. Functional MRI also has the advantage of being dynamic in terms of allowing patients to perform a Valsalva maneuver. Similarly to CT, however, the patient must be either supine or prone, and the high cost of this imaging modality is obstacle. Furthermore, most surgeons are generally not comfortable with image interpretation.(7)

Detection of smaller, yet symptomatic ventral and incisional hernias can often be challenging, especially in the obese patient. In contrast, incisional and recurrent hernias of the ventral abdominal wall highly complex, involving significant adhesions to both omentum and abdominal viscera, abdominal muscle atrophy, and even loss of abdominal wall domain in the setting of a very large defect. Consequently, thorough evaluation and treatment of the ventral hernia can require both rapid and inexpensive modalities for detecting small defects, as well as high-resolution studies capable of predicting repair complexity in large recurrent defects.(7)

Ultrasound

For detecting ventral abdominal hernias, US has the advantage of being inexpensive, dynamic, and non-invasive. In the past, however, its utility has been limited by lack of standardized technique and operator variability, resulting in a sensitivity of only 71%.⁽⁸⁾

Beck et al. have described a straightforward, standardized, and surgeon performed approach to using US and the detection of midline and lateral abdominal hernia defects. Termed Dynamic Abdominal Sonography for Hernia (DASH), the technique uses a 12-MHz linear ultrasound probe in five sequential cranial-to-caudal passes of the ventral abdominal wall to detect even small fascial defects.⁽⁹⁾

DASH has resulted in a highly sensitive (98%) and specific (88%) method for hernia detection, even exceeding that of CT, costing significantly less.⁽⁹⁾

Ultrasound evaluation can still be limited in the severely obese with a very thick layer of subcutaneous fat obscuring the small detail of the underlying abdominal wall. Additionally, comprehensive evaluation of large defects by ultrasound can be challenging due to small probe size and the inability to perform three-dimensional reconstruction of the hernia sac. Both of these limitations can potentially be overcome by the use of an Automated Breast Volume Scanner (ABVS) as described in the recent report from *Diao et al.*⁽¹⁰⁾

Computed Tomography

Due to its rapid image acquisition, demonstration of fine morphologic detail, 3-D CT is generally the most popular imaging modality for the evaluation of known ventral abdominal hernias.⁽⁷⁾

Although a non-contrasted study is sufficient in most situations, IV contrast should be used if there is a suspicion of infection or malignancy and the patient has satisfactory renal function. Perhaps most important is the ability to use CT imaging to preoperatively predict the surgeon's ability to close a given hernia defect in an abdominal wall reconstruction. Several algorithms are currently being developed for this purpose, such as the one described by Allen and colleagues. Their protocol allows for highly accurate length and volume calculations of the critical abdominal wall structures and compartments from otherwise standard axial and sagittal CT images.⁽¹¹⁾

Significant differences were seen with regard to transverse defect size, defect area, and the percentage of the total abdominal wall occupied by the defect in patients in whom fascial reapproximation was achieved as opposed to those who required a bridged repair. Having such knowledge preoperatively can significantly influence surgical decision making in terms of an open versus laparoscopic approach, the type of mesh prosthetic used, and ultimately the placement of prosthetics. This is especially applicable in the setting of a recurrent hernia and a planned reoperation for abdominal wall reconstruction. Thus, it is common to obtain preoperative CT scans on patients with large, complex, or recurrent defects. This allows for optimal operative planning and it maximizes the surgeon's chances of achieving fascial closure in these challenging patients.(12)

Magnetic Resonance Imaging

Given the high degree of accuracy with which CT is able to characterize most ventral hernia defects, the use of MRI for this purpose is significantly limited. Although it does avoid radiation exposure of CT, additional cost of MRI is not typically justified to use as a routine imaging modality(7)

The one advantage that MRI can have over CT in the setting of recurrent hernia is an enhanced ability to visualize prosthetic mesh and its potential for dynamic assessment of the abdominal wall and visceral motion when using functional "cine" MRI. Namely, images can be obtained with the patient both at rest and during performance of a Valsalva maneuver. The motion of the abdominal viscera relative to that of the abdominal wall ("visceral slide") can then be ascertained and used to predict the degree of adhesion formation in a postoperative patient.(13)

In May 2009 report by *Kirchhoff et al.*, functional cine MRI was used to locate and quantify intra-abdominal adhesions in 43 patients who had undergone prior ventral hernia repair by either an open or laparoscopic approach. Twenty-five patients subsequently underwent reoperation, and after quantifying adhesions intraoperatively, the accuracy of MRI for predicting these adhesions was found to be approximately 86%. The routine use of MRI for ventral hernia evaluation is not currently advocated outside the setting of a clinical trial. However, the imaging modality does show prominence for adhesion identification and could influence surgical decision making in patients without a detectable recurrence, but with significant abdominal pain after prior ventral hernia repair with mesh placement.(14)

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