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Lateral abdominal wall hernia: A surgeon's dilemma

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Abstract

Flank and lateral abdominal wall defects are a rare as well as challenging entity for surgeons as they differ vastly in regard to their anatomy, etiology, and pathophysiology. They remain an infrequent topic of discussion in the literature despite the potential of causing fatal consequences. Various approaches have been practiced and reviewed in details which have produced promising results. But, despite this, there is no general consensus regarding the proper method of repair of these hernias. Lateral wall defects typically result from iatrogenic causes, trauma, and are rarely congenitally acquired. In this article, we aim to highlight on the various operative methods we have performed for individual patient presenting with lateral abdominal wall hernia which have been tailored according to the patient's requirement and all have shown satisfactory results.

Keywords: Lateral abdominal wall hernia, Meshplasty, component separation technique, incisional hernia

Introduction

Lateral abdominal wall hernias occur less frequently than ventral abdominal hernias but they can progress to a very large size and cause significant morbidity. Lateral abdominal wall hernias are a distinct entity from ventral abdominal wall hernias with respect to their anatomy, clinical behavior, and surgical management. The etiologies of the defect, the presence of substantial static anatomic supporting structures, and extent of reinforcement have a significant impact on long-term recurrence rates. The literature lacks a detailed study of the interaction of the various forces and stresses associated with the lateral abdominal wall. Our understanding of the mechanics of lateral abdominal wall defects is therefore derived from our knowledge of ventral abdominal wall physiology.

The majority of cases tend to be incisional hernias in nature and better managed by mesh reinforcement. Also, midline laparotomy incision is usually followed by lateral dissection in the preperitoneal plane or transversus abdominis release (TAR) plane toward the hernia defect. Laparoscopy also provides an excellent view of the defect and location of the hernial sac.

With this case series, we bring forward the different operative interventions opted for different lateral abdominal hernia cases on the basis of their presentation.

Case series

Case 1

70years old female presented with a history of painless right lower abdominal swelling at previous scar site following emergency open appendicectomy for acute appendicitis 40 prior. Abdominal ultrasound showed a large gap defect in the Right Iliac Fossa region with herniation of healthy bowel loops and omentum. CECT abdomen and pelvis revealed 5.6 x 4.2 cm sized defect in right anterolateral abdominal wall in right lumbar region through which bowel loops and mesentery seemed to herniated from. Intra-operatively the attenuated external oblique aponeurosis was divided in the line of incision. The internal oblique fibers were split to reveal the hernial sac containing bowel loops. The hernial sac was dissected and reduced. Prolene meshes of size 12 cm diameter in sublay technique, 15 x 15 cm² mesh in intermuscular plane and 20x15 cm² meshes over external oblique was fixed. Patient had an uneventful post-operative recovery.

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Fig 1: The incisional hernia post open appendectomy.



Fig 2: Mesh between the internal oblique and the external oblique muscle



Fig 3: Mesh placed over external oblique

Case 2

A 24-year-old female presented with pain and a bulge in the right lower quadrant of abdomen of one-month duration. She had a history of open appendectomy 4 years back. The postoperative period was complicated by surgical site infection which was managed conservatively. She had developed a hernia

in the medial part of the incision at the right iliac fossa region 2 years back for which an onlay mesh repair with a polypropylene mesh was done. Ultrasound examination of the abdomen showed a hernial sac containing bowel just under the scar; under the cover of the external oblique. A diagnosis of recurrent incisional hernia was made and the patient was scheduled for surgery. We did a laparoscopic IPOM Plus repair. She was reviewed at one, two and six months after surgery wherein she was asymptomatic, without recurrence of hernia.

Case 3

A 40-year-old female presented with a bulge in the right lower quadrant of abdomen of six month duration. She had a history of open appendectomy 8 years back. Following that she developed hernia in the right iliac fossa region 5 years and 2 years back for which she had done onlay mesh repair. The postoperative period on second occasion was complicated by surgical site infection which was managed conservatively. Physical examination revealed a well-healed scar with a diffuse swelling visible over the scar. She was subjected to a contrast-enhanced computed tomography of the abdomen, which showed mild thinning with focal bulge in anterior abdominal wall muscles. We did a laparoscopic IPOM Plus repair. She was discharged on the 2nd postoperative day without any adverse events.



Fig 4: Mesh being kept over defect in Lap Ipom



Fig 5: Post-operative no bulge is seen over abdomen.

Case 4

A 35-year-old male presented with history of injury due to horn strike by stray cattle around ten days back. He complained of pain & bruising at the site of injury over flank. Ecchymosis over right lumbar region with intact skin without any local swelling

or distension of abdomen was noted. On palpation localized tenderness with 1 cm x 2 cm sized defect and Impulse on coughing was noted. CECT Abdomen + Pelvis demonstrated, focal defect of approx. 13 mm x 19 mm within the anterior abdominal wall in right sub hepatic region with herniation of omentum. Surgical exploration of the local part with normal colored Herniated Omental fat piercing all fascio-muscular layers noted and hence forward reduction of omentum with anatomical repair of the defect was done.



Fig 6: focal defect in the anterior abdominal wall in right sub hepatic region with herniation of omentum

Case 5

45years old male presented with history of painless left flank swelling along with umbilical swelling at previous scar site following emergency exploratory laparotomy for assaulted penetrating injury over abdomen causing exentration of small bowel nearly 5 years ago. A diagnosis of incisional hernia was made. CECT abdomen and pelvis revealed 148 mm x 133 mm sized defect in left para umbilical region through which bowel loops and omental fat was protruding out. A defect of 43 mm x 30 mm was also noted in left rectus muscle also. Patient was planned for incisional hernia repair through a midline laparotomy approach and bilateral posterior component separation along with bilateral Transverse abdominis release was performed. In addition retro rectus with onlay meshplasties was also performed. Patient had an uneventful post-operative recovery.



Fig 7: Large gap defect in the left para umbilical and lumbar region

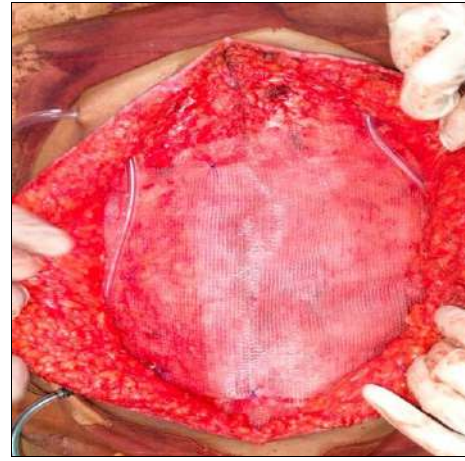


Fig 8: Defect repair with bilateral posterior component separation along with bilateral Transverse abdominis along with retro rectus and onlay meshplasties

Case 6

A 16 year young, male patient presented following accidental blunt abdominal trauma due to impact of handlebar of bicycle. On thorough clinical examination, he had bruises over right lower abdomen with the impact mark of the object measuring 5 x 4 cm², with tenderness on palpation and visible bulge on exertion, which was reducible in nature. CECT scan of abdomen and pelvis was done, which showed ill-defined defect with fluid within of size 19 mm x 10 mm in anterior abdominal wall on lateral aspect of right rectus muscles in RIF region. Laparoscopic exploration was done which showed approximately 6 x 2 cm² gap defect in right iliac region with herniated omental fat. No bowel loops were visualized to be herniated. The herniated fat was reduced back in the abdominal cavity and the defect was primarily closed.



Fig 9: CECT showing ill-defined defect with fluid within of size 19 mm x 10 mm in anterior abdominal wall on lateral aspect of right rectus muscles in RIF region.

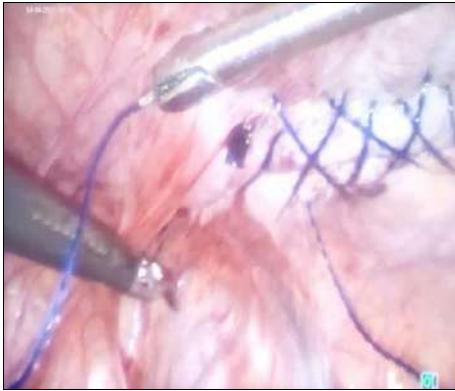


Fig 10: Anatomical closure of defect done via Laparoscopic approach

Case 7

A 38-year-old female presented with swelling over both side of abdomen, induced by falling onto ground while climbing a ladder a few months ago. After a complete history of the mechanism of injury was obtained, the clinical assessment revealed a 20 cm x 20 cm bulging over right side of abdomen and 10 cm x 8 cm bulge over left side abdomen which were painless on palpation and was well demarcated. Ultrasound scan revealed two gap defects of sizes 51 mm and 40 mm on right and left para umbilical region respectively. The hernia was initially managed conservatively with abdominal binder and life style modifications for around 3 months. Following no benefits an abdominal computed tomography (CT) scan was done which revealed two focal defects in RIF and LIF region respectively with herniation of small bowel loops. Repair of both the hernias were done by bilateral Posterior component separation with transverse abdominis release with Retro rectus meshplasty following reduction of herniated contents.

Case 8

A 58-year-old male presented with a non-traumatic bulge in the left lower quadrant of abdomen of one month duration. He was subjected to a contrast-enhanced computed tomography of the abdomen, which showed focal defect of 84 mm x 71 mm at left lumbar region and left iliac fossa region with herniation of omental fat, small bowel loops and descending colon. Patient was initially planned to manage with Laparoscopic transabdominal preperitoneal (TAPP) meshplasty. During intraoperative procedure defect was found to be large enough to close satisfactorily and we proceed with Laparoscopic TAPP plus Hybrid meshplasty via anterior abdominal wall incision to keep prolene mesh at retro rectus space.

Discussion

There are various types of abdominal wall hernias. Common types of hernias such as inguinal hernia, femoral hernia, and umbilical hernia can be diagnosed easily by their locations. However, LAWH is rare^[1]. The Lateral abdominal wall (LAW) encompasses the region from the linea semilunaris to the paraspinous muscles posteriorly and from the costal margin to the inguinal canal/iliac crest beyond the central abdominal wall, which is defined laterally by the linea semilunaris, superiorly by the medial costal cartilage and inferiorly by the pubic bone and medial inguinal ligament. The myofascial anatomy of the LAW is comprised of the external oblique muscle, internal oblique muscle, transverse abdominis muscle, and transversalis fascia with their associated obliquely oriented neurovascular bundles. These muscle layers have relatively little aponeurotic substance laterally and when injured or deinnervated are more difficult to

repair than defects in the anterior abdominal wall^[1, 2].

Within the general category of lateral wall defects, there are multiple subdivisions. These were best described by “Baumann and Butler” and include paramedian, lateral, subcostal, and paraspinous defects. Paramedian defects, such as Spigelian hernias, involve the intact linea alba and abnormal linea semilunaris. Lateral defects involve the aforementioned oblique muscle conglomeration and their attachments cranially to the costal margin and caudally to the iliac crest. Subcostal defects include the upper abdomen, chest wall, and potentially the diaphragm. Lumbar defects are synonymous with paraspinous defects and involve the origins of the external oblique, internal oblique, and transversus abdominis. Grynfeltt hernias occur along the superior lumbar triangle, whereas petit hernias reside along the inferior lumbar triangle. These defects are by definition asymmetrically located within the abdominal wall. Thus, the distraction forces on the defect create inherent imbalanced strain on the anterior rectus and posterior paraspinous muscle bundles leading to progressive flank herniation, bulge, lumbar spine ligamentous strain, and lower back pain^[1, 2].

Iatrogenic causes are recognized as the major etiologic culprit for lateral wall defects. The abdominal musculature innervated in segments by the T7–T12 spinal roots. Disturbance of these nerves can lead to weakening of the lateral wall musculature, generating bulges or hernias. Iatrogenic abdominal wall defects can arise from any incision that causes either deinnervation of external oblique, internal oblique, or transverse abdominis muscle fibers or disinsertion of their common origin in the paraspinous region or the insertion at the linea semilunaris. Certain procedures leave patients more vulnerable to suffer from this phenomenon. Majority of Flank bulges were noted in patients undergoing radical nephrectomy with a flank incision. Incisions in the weaker regions of the abdominal wall such as the Kocher and Chevron incisions used in hepatobiliary surgery and oncologic resections can result in lateral wall defects^[3].

The natural evolution of these hernias is a steady growth in size, becoming more and more symptomatic. Clinical suspicion is fundamental to guide imaging diagnosis because extra peritoneal fat herniated through a wall defect may mimic a lipoma. Computed tomography (CT) or magnetic resonance imaging (MRI) in patients with a suspected hernia can confirm the diagnosis adding information on parietal defect size, hernia content and muscular tropism. CT is also helpful in eliminating other differential diagnoses such as Lipomas, fibromas, abscesses, hematomas, and muscle strains, none of which should cause bowel obstruction. Ultrasound at initial stage may prove a useful way of distinguishing a fluid-filled structure such as bowel from a solid mass, abscess, or hematoma, and may prompt an attempt at bedside reduction. These hernias should be repaired in all except high-risk patients. As surgical correction is always more difficult in advanced cases, surgery must be indicated as early as possible. Before going for any procedure we should establish a complete diagnosis in terms of knowing the size, location, and contents of the defect and for this reason, it is advisable to have CT available before planning a surgery^[3, 4].

In the central abdominal wall, centralizing the rectus abdominis complexes and offloading of tension on the repair with a bilateral component separation release establishes a balanced dynamic structurally sound repair. This is not possible in LAW. The options for reconstruction are to provide a static repair that will not attenuate and form a bulge or hernia over time. The reconstruction is planar as opposed to the curvilinear or convex form of the native LAW. The goal is to reinforce the entire hem-

abdominal wall with fixation to anatomic structures that will not stretch or attenuate over time [4, 5].

The core surgical principles of ventral hernia repair apply to lateral abdominal wall reconstruction. These include inlay mesh repair and myofascial re-approximation to create a dual layer closure and establish physiologic tension across the abdominal wall closure [1]. The anterior approach is quite traumatic and requires a major dissection to define the damaged planes and locate the defect, but it has the advantage of enabling us to perform a complete parietal reconstruction. The laparoscopic approach has the advantage of being minimally invasive (less pain, shorter length of hospital stay, and fewer wound complications); it also avoids major dissections, allows exact

location of the lesion, and offers an excellent visualization, thus avoiding possible lesions to neighboring structures. However, the laparoscopic approach does not allow for parietal reconstruction or repair under controlled tension [4, 6]. A hernioplasty via the anterior approach or using extra peritoneal laparoscopy on small defects with extra peritoneal contents; the trans abdominal approach on moderate defects with para-peritoneal or intraperitoneal hernias and an anterior repair with a multiple mesh or in cases of recurrence or diffuse hernias larger than 15 cm is recommended. Laparoscopic repair has been used successfully in different reports with less pain, shortened hospital stay and good cosmetic and functional results [2, 7].

Table 1: Showing Different Operative approach and Procedures for Different Presentation of Lateral Wall Abdominal Hernias

Sr no	Age/sex	Nature of hernia	Defect size (cecet)	Defect location	Approach of surgery	Operative procedure
1	70/F	Recurrent incisional hernia	56 mm X 42 mm	Right iliac fossa	OPEN	Sublay + inlay + onlay meshplasty
2	24/F	Recurrent incisional hernia	32 mm X 39 mm	Right iliac fossa	Laparoscopic	Laparoscopic Ipom plus
3	40/F	Recurrent incisional hernia	Focal bulge in anterior abdominal wall muscles	Right iliac fossa	Laparoscopic	Laparoscopic Ipom plus
4	35/M	Post-traumatic primary hernia	13 mm X 19 mm	Right lumbar	Open	Anatomical repair
5	45/M	Incisional hernia	i)148 mm X 133 mm ii)43 mm X 30 mm	I) Left paraumbilical II) Left flank	Open	B/l posterior component separation + b/l transverse abdominis release + retrorectus + onlay meshplasty
6	16/M	Post-traumatic primary hernia	19 mm X 10 mm	Right iliac fossa	Laparoscopic	Anatomical repair
7	38/F	Post-traumatic primary hernia	i)135 mm X 71 mm ii)130 mm X 58 mm	I) right iliac fossa II)left iliac fossa	Open	B/l posterior component separation + b/l transverse abdominis release + retrorectus meshplasty
8	48/M	Primary hernia	84 mm X 71 mm	Left lumbar + left iliac fossa	Laparoscopic + open	Laparoscopic transabdominal pre peritoneal + open retro rectus meshplasty

In our study we have successfully repaired two recurrent incisional hernias at RIF region following open appendectomy with Laparoscopic IPOM repair. In two post traumatic lumbar hernias simple anatomical closure of defect yields satisfactory outcomes. Interesting being a case of recurrent incisional hernia at RIF region which was repaired with a unique triple meshplasties technique which has very little literature covered to it. We have preceded with component separation technique coupled with meshplasties in two of our cases having large and multiple defects also. And in the last case a hybrid method was used involving both open and laparoscopic approach to repair a primary non traumatic lumbar hernia with laparoscopic TAPP with open retro rectus meshplasty. Each case was unique in their presentation and have been managed in a salient way with satisfactory results.

Conclusion

Lateral abdominal wall hernias are truly unique in every sense. Lateral abdominal wall hernia should be suspected when patients note a progressive bulging of the lateral abdominal wall with occasional back pain near the origins of the oblique musculature. The principles used to repair ventral wall hernias will not yield successful results every time. Lateral wall defects need to be managed taking considerations of fascia and muscular layers. Majority of the defects require surgical repair with mesh reinforcement. Hernias close to the midline require a midline incision for mesh repair in the transversus abdominis release (TAR) plane while hernias completely in the lateral aspect are managed well by laparoscopic methods. A proper understanding of anatomy and techniques must be grasped before a surgeon

can truly engage this challenging endeavor.

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Author's Contribution

Not available

Conflict of Interest

Not available

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