·CASE ANALYSES· ·临床病例讨论·

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机器人辅助手术治疗复杂腹壁巨大切口疝3例

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[摘 要] 腹壁切口疝是开腹手术最常见的并发症之一，其中腹壁巨大切口疝的定义为腹壁缺损最大直径>12 cm或疝囊容积与腹腔容积比>20%。腹壁巨大切口疝的主要治疗方法为手术治疗，开放手术和传统腹腔镜手术治疗难度和手术创伤均较大，术后并发症多，治疗效果不理想。2021年5月至2023年11月中南大学湘雅三医院收治了3例腹壁巨大切口疝的患者，并对其进行了达芬奇机器人辅助下腹腔内补片修补术(robotic-assisted intraperitoneal onlay mesh，rIPOM)。患者术中出血少，术后恢复时间短，未发生切口感染及严重并发症，无再次复发。相较于传统开放手术、腹腔镜手术，机器人辅助手术在腹壁巨大切口疝临床应用上具有独特优势。

[关键词] 腹壁巨大切口疝；机器人辅助手术；疝修补术；达芬奇机器人；补片；腹腔镜手术

Robotic-assisted surgical treatment of complex giant incisional hernias: A report of 3 cases

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ABSTRACT Incisional hernia of abdominal wall is one of the most common complications following open surgery. Giant incisional hernia of abdominal wall is defined as having a maximum defect diameter >12 cm or a hernia sac volume-to-abdominal cavity volume ratio >20%. The Primary treatment for giant incisional hernia of abdominal wall is surgical repair; however, both open surgery and conventional laparoscopic surgery are associated with significant technical difficulty, high surgical trauma, frequent postoperative complications,

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and suboptimal outcomes. From May 2021 to November 2023, 3 patients with giant incisional hernia of abdominal wall were treated at the Third Xiangya Hospital of Central South University with robotic-assisted intraperitoneal onlay mesh repair using the da Vinci surgical system. These patients experienced minimal intraoperative bleeding, rapid postoperative recovery, no wound infections or severe complications, and no recurrences. Compared with traditional open and laparoscopic surgeries, robotic-assisted surgery demonstrates unique advantages in the clinical management of giant incisional hernias.

KEY WORDS giant incisional hernia of abdominal wall; robotic-assisted surgery; hernia repair; DaVinci robot; mesh; laparoscopic surgery

腹壁切口疝是开腹手术最常见的并发症之一，其发病率为5%~25%，在高危患者中可高达40%[1]。腹壁切口疝是由于原手术的腹壁切口筋膜和(或)肌层未能完全愈合，在腹腔内压力的作用下形成的腹外疝，其中巨大腹壁切口疝的定义为腹壁缺损最大直径>12 cm或疝囊容积与腹腔容积比>20%[2]。目前腹壁巨大切口疝的推荐治疗方法为手术治疗，补片在腹壁间放置的位置可分为腹壁肌肉前(onlay)、腹壁肌肉后(sublay)、腹膜腔内放置[腹腔内补片修补术(intraperitoneal onlay mesh，IPOM)或underlay][2]；另外，当无法关闭肌肉、筋膜时可部分使用修补材料进行“桥接(bridge)”[2-3]。复杂的腹壁巨大切口疝的修复具有挑战性，治疗难度大，并发症较多，传统术式可能无法达到理想的治疗效果。相较于开放手术和传统腹腔镜手术，机器人辅助下IPOM(robotic-assisted IPOM，rIPOM)对患者的创伤小，患者术后恢复快，且在手术过程中精确性和稳定性更好，可增加手术安全性，减少手术并发症[4-5]。本研究将2021年5月至2023年11月中南大学湘雅三医院收治的3例腹壁巨大切口疝患者的临床资料和诊治情况报告如下。

1 病例资料

患者1为54岁女性，身高159 cm，体重60 kg，体重指数23.7 kg/m^2，入院时主诉为“腹壁切口疝修补术后10月，5月前复发”。患者既往有右半结肠根治术史、切口疝修补术史。入院后体格检查结果：腹部正中可见原手术瘢痕，腹部稍膨隆，下腹部可扪及约15 cm×10 cm可复性包块，站立时张力升高，平卧可回缩，包块高于周围腹壁，质软，无明显压痛，余腹部无压痛及反跳痛。腹部CT三维重建结果：中下腹可见159.89 mm×75.52 mm缺口，部分腹腔内脂肪组织向皮下膨出(图1)。

患者2为58岁男性，身高172 cm，体重80 kg，体重指数27 kg/m^2，入院主诉为“下腹部巨大包块2年”，既往有双侧腹股沟疝史、脐疝史，行侧位完全腹膜外修复术联合脐疝开放sublay修补，术后因粘连性肠梗阻行切口裂开缝合及脐疝onlay修补术。入院后体格检查结果：腹部可见原手术瘢痕，腹部膨隆，下腹部可扪及约30 cm×20 cm可复性包块，站立时张力升高，平卧可回缩，包块显著高于周围腹壁，质软，无明显压痛，余腹部无压痛及反跳痛。腹部CT三维重建结果：脐周腹壁欠连续，见约155.72 mm×125.36 mm缺口，部分肠管、肠系膜及腹腔内脂肪疝进入皮下脂肪间隙(图2)。

患者3为67岁男性，身高182 cm，体重80 kg，体重指数24.2 kg/m^2，入院时主诉为“下腹部肿块6年余，加重伴胀痛1月余”。患者既往因直肠恶性肿瘤行直肠低位前切除术(Dixon术)。入院后体格检查结果：腹部可见原手术瘢痕，腹部膨隆，下腹部可扪及约12 cm×5 cm可复性包块，站立时张力升高，平卧可回缩，高于周围腹壁，质软，无明显压痛，余腹部无压痛及反跳痛。腹部CT三维重建结果：下腹部腹壁肌肉薄弱，见约126.14 mm×67.60 mm缺口，部分肠管及肠系膜向皮下脂肪间隙膨出(图3)。

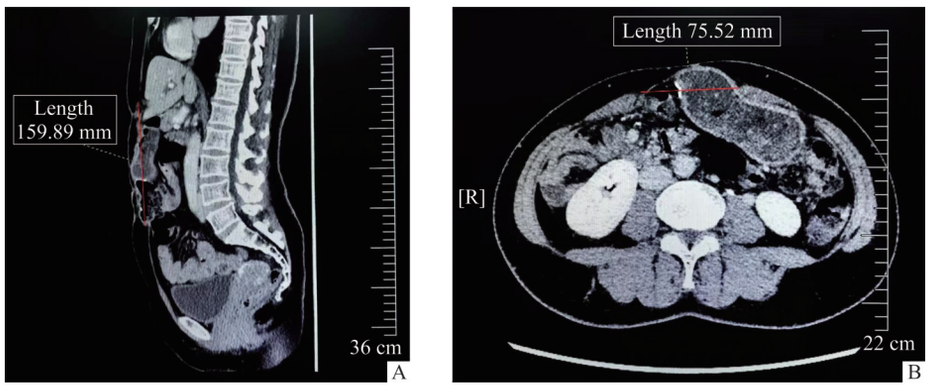

图1 54岁女性腹壁巨大切口疝患者腹部CT三维重建

Figure 1 Abdomen CT three-dimensional reconstruction of a 54-year-old female patient with giant incisional hernia of abdominal wall

A: Median sagittal section; B: Transverse section.

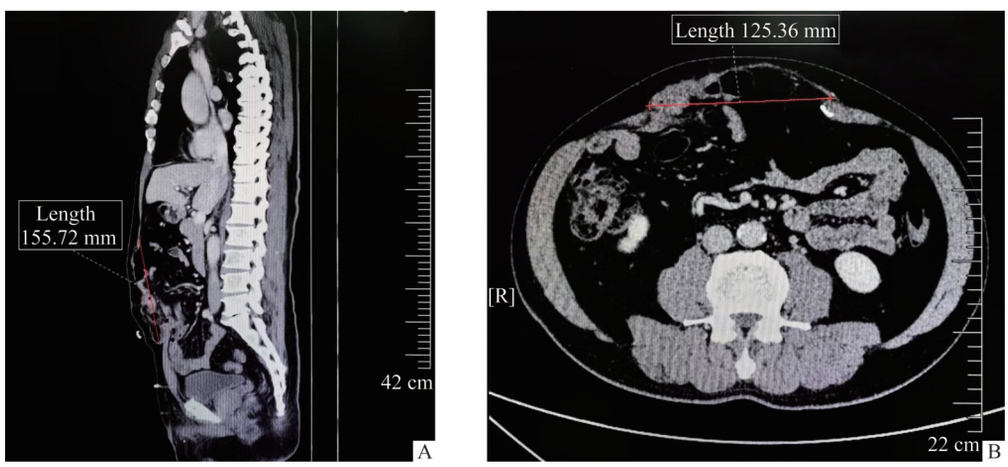

图2 58岁男性腹壁巨大切口疝患者腹部CT三维重建

Figure 2 Abdomen CT three-dimensional reconstruction of a 58-year-old male patient with giant incisional hernia of abdominal wall

A: Median sagittal section; B:Transverse section.

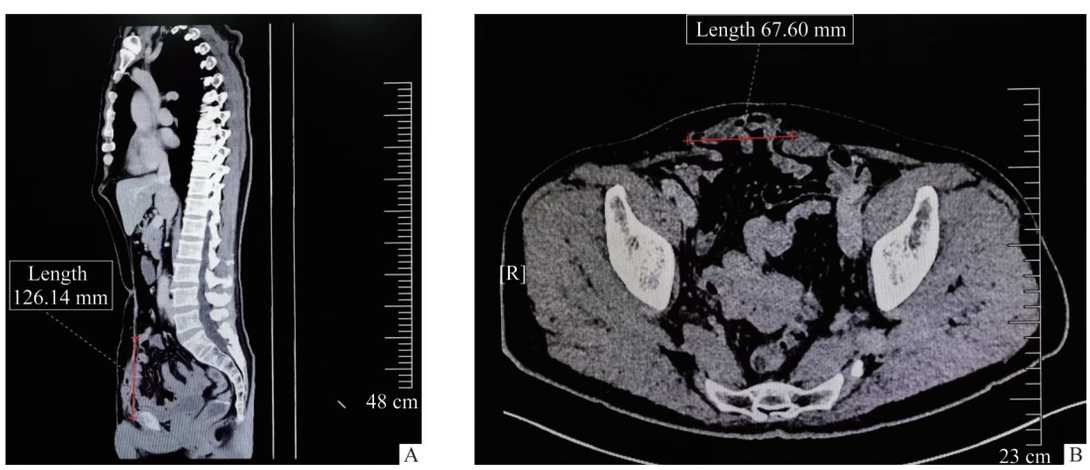

图3 67岁男性腹壁巨大切口疝患者腹部CT三维重建

Figure 3 Abdomen CT three-dimensional reconstruction of a 67-year-old male patient with giant incisional hernia of abdominal wall

A: Median sagittal section; B:Transverse section.

3例患者均被诊断为腹壁巨大切口疝，经综合评估后，均接受达芬奇rIPOM治疗。手术过程：患者仰卧于手术台上，Trocar分布在腹壁缺损区域边缘(图4A)，1个观察孔直径为12 mm，3个操作孔直径分别为8、8、5 mm，穿刺时注意避免损伤肠管。通过达芬奇机器人手术系统的3D视野仔细探查腹腔。紧贴腹壁，使用剪刀、电钩或超声刀等对疝内容物进行锐性分离，分离范围在疝环外侧5 cm以上。使用2-0 Prolene不吸收线间断缝合肌筋膜层缺损的低张力处，尽可能缩小缺损，对于无法完全关闭的缺损，使用修补材料进行“桥接”。使用标尺测量疝环的大小，根据测量结果裁剪补片，确保补片超出缺损边缘3~5 cm。在补片的4个角预置4根2-0 Prolene不可吸收缝线形成“锚点”(图4B)，置入修剪好的补片，将补片延长轴卷起并通过12 mm观察孔送入腹腔，让防粘连面对准腹腔。在“锚点”处置入腹壁缝合器，分别拉起补片预置的4根线，将补片与缺损贴合。操作机器人操作臂，用2-0 Prolene不可吸收线在补片边缘和疝环做双圈缝合固定，外圈位于距离补片边缘约0.5 cm处，行间断缝合，针距以0.5~1.0 cm为宜，内圈位于疝环边缘外1 cm处，行连续缝合。3例患者所用的补片均为单面防粘连涂层疝补片，患者1和3所用的补片大小为15 cm×20 cm，患者2所用的补片大小为20 cm×25 cm。3例患者手术用时分别为255、270、335 min，手术出血量分别约3、3、50 mL，分别在术后5、7、5 d出院。3例患者术后切口均为I期愈合，均无切口感染及严重并发症发生，均未发生补片排斥反应。目前均无再次复发。患者2手术治疗前后的比较见图5。本研究已获得患者及其家属知情同意。

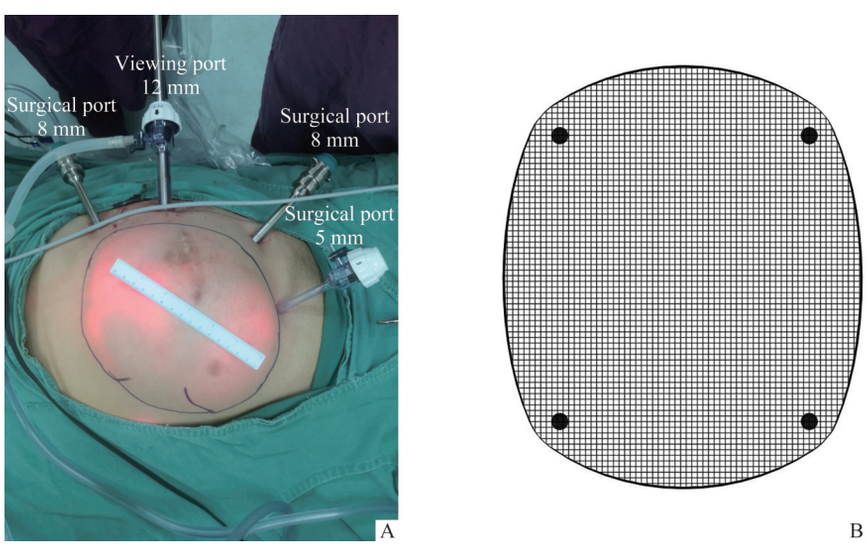

图4　达芬奇机器人辅助下腹腔内补片植入术中Trocar分布(A)及补片固定位置(B)

Figure 4　Trocar distribution (A) and fixed position of the mesh (B) in DaVinci robotic-assisted intraperitoneal onlay mesh

The 4 black dots in Figure B located at the periphery of the mesh indicate anchor points for the fixation of the hernia mesh.

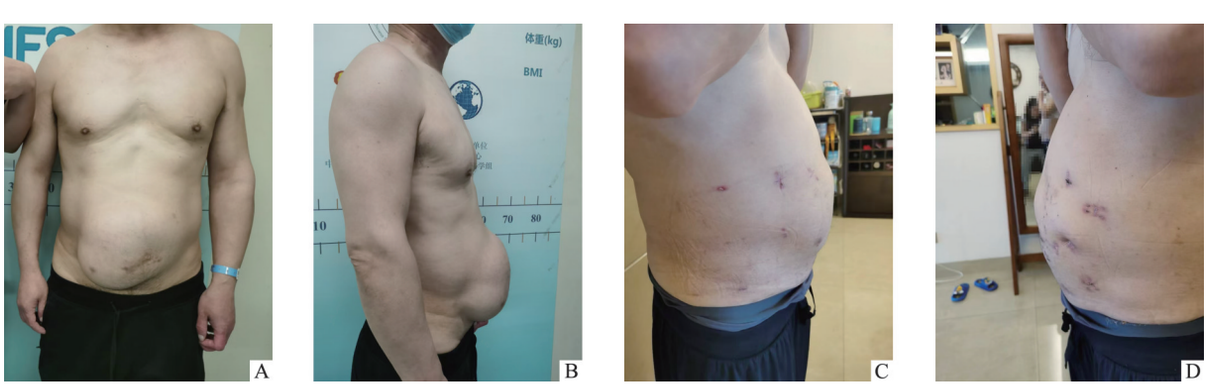

图5　达芬奇机器人辅助下腹腔内补片植入术治疗前后的比较

Figure 5　Comparison before and after DaVinci robotic-assisted intraperitoneal onlay mesh

A−B: Preoperative frontal view (A) and lateral view (B). C−D: Postoperative right lateral view (C) and left lateral view (D).

2 讨 论

在临床上，复杂的腹壁巨大切口疝的手术修复是一项高风险的手术，其治疗方法仍具有争议[6-7]。对于复杂巨大切口疝，完全关闭缺损难度较大[3]，因此通常会选用开放手术。开放手术虽能更直观地进行操作，但对患者的创伤较大，术后恢复时间较长，且会增加肠粘连、肠管损伤及腹腔间隔室综合征等并发症的发生风险。

多项外科领域的高质量随机对照试验研究[8-10]结果均表明：与开放手术相比，腹腔镜手术在减少疼痛和术后并发症，缩短住院时间等方面具有明显优势。在传统腹腔镜手术中，因腹腔镜器械直线式操作的局限性，极大增加了补片放置后缝合固定的难度，需借助于钛螺旋钉[11-12]等来固定补片，但钛螺旋钉的深度不可把控，对腹腔刺激较大，容易引起腹腔内粘连、排斥反应及术后疼痛等并发症；此外，手术过程中更换器械的时间也不可忽视。因此对于复杂巨大切口疝采用开放手术和传统腹腔镜手术的效果均不理想[13]。

在临床实践中，笔者发现机器人手术在治疗复杂巨大切口疝方面具有独特优势。达芬奇机器人拥有3D成像技术和铰接式器械[14-15]，这使其成为腹壁疝修补术中将补片缝合到前腹壁后层的理想工具，可以在复杂的情况下完成高难度操作。相较于传统腹腔镜手术使用的钛螺旋钉等材料固定，传统缝合更加牢靠，术后疝复发率低，对腹腔刺激也较小[16]。开腹手术的手术切口明显大于机器人手术，发生切口感染的风险也随之增加，并可能继发补片感染，甚至需再次手术取出补片。机器人辅助手术具有其独特的优势[4-5]，其安全性和稳定性也得到了证实[17]。3D成像技术和铰接式器械的应用帮助外科医师突破了传统腹腔镜手术的局限性。腹部手术具有一定复杂性和可变性。机器人辅助手术在盆腔手术中的应用较为缓慢，在泌尿外科和妇科手术中，研究[18-20]报道机器人辅助手术与开放手术和腹腔镜手术的结果相似，另有研究[21-23]则提出机器人辅助手术更适合复杂手术。

综上，机器人辅助手术治疗腹壁巨大切口疝安全且有效，在减少创伤的同时，又可使用传统缝合技术固定补片，相较于开放手术、腹腔镜手术，机器人辅助手术有其独特的优势，且更适合复杂或具有挑战性的手术。笔者相信随着rIPOM治疗腹壁巨大切口疝病例的积累、手术经验的增加以及临床试验的发展，未来其优势将更显著。

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