

· 老年人骨关节病专栏 ·

老年人巨大肩袖撕裂的关节镜治疗进展

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【摘要】 巨大肩袖撕裂在老年人群中发病率高,可引起肩关节疼痛和功能障碍,严重影响患者生活质量。肩袖撕裂通常伴随肌腱回缩、变性,肌肉萎缩、脂肪浸润,且老年人骨质疏松严重,使修复更加困难,术后再撕裂率高。本文对清理减压、完全修复术、部分修复术、补片修复和上关节囊重建治疗巨大肩袖撕裂疗效和预后的最新进展做一综述,为外科医师的临床决策提供理论支撑。

【关键词】 老年人;肩袖;巨大肩袖撕裂;关节镜;修复

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Arthroscopic repair of massive rotator cuff tear in the elderly: a progress

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【Abstract】 The incidence of massive rotator cuff tear is quite high in the elderly patients. It can result in pain and shoulder dysfunction, and reduce their quality of life greatly. Massive rotator cuff tear usually accompanies with tendon retraction, degeneration, muscle atrophy, and fat infiltration. What's more, because the elderly patients commonly have severe osteoporosis, it further makes the repair more difficult and with high post-operative tear rate. The article reviewed the recent progress on the clinical efficacy and prognosis of 5 surgical strategies in the treatment, that is, debridement and decompression, complete repair, partial repair, patch repair and reconstruction of shoulder joint capsule, in order to provide theoretical foundation for the surgeon's decision making.

【Key words】 aged; rotator cuff; massive rotator cuff tear; arthroscopy; repair

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巨大肩袖撕裂(massive rotator cuff tear, MRCT)是指撕裂口 > 5 cm 或者累及 ≥ 2 根肌腱的肩袖损伤^[1],通常伴随肌腱回缩、变性,肌肉萎缩、脂肪浸润。老年 MRCT 与中青年相比,其发病机制多以肩袖退变和撞击为主,症状体征不典型、肩袖足印区骨质疏松严重,导致锚钉把持力不足,术后锚钉拔出和肩袖撕裂再发率高,使其修复更加困难。本文就 MRCT 不同修复方法的生物力学及临床疗效做一综述。

1 MRCT 治疗原则

重建肩袖力偶、恢复力学平衡;最大程度恢复肩袖组织对足印区的覆盖,为腱-骨愈合创造良好条

件;获得可靠的初始固定强度,为术后进行积极的康复锻炼创造条件;扩大肩峰下间隙、去除撞击因素;处理疼痛根源,改善功能。

2 清理减压术

对术后功能要求较低,肩关节功能尚可,主要诉求为缓解疼痛,年龄较大的患者可选择肩关节清理减压术。手术关键是清理肩袖撕裂缘、增生钙化灶、炎性滑囊、进行有限的肩峰成型。虽然仅行肩峰成形和清理减压不能阻止肩袖撕裂进一步发展,术后肩袖力量无明显改善甚至下降,但术后疼痛明显缓解,功能得到改善^[2]。肱二头肌长头腱近端的损伤是疼痛的来源^[3],切断术和固定术都可显著减轻疼痛。

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3 肩袖松解缝合技术

多数 MRCT 患者肌腱回缩,将回缩的肩袖复位至足印区是修复固定的关键。松解肩袖组织,若仍不理想,可采取肩袖间隙滑移技术^[4],即松解冈上肌腱与肩胛下肌腱的前间隙,冈下肌腱和小圆肌腱的后间隙,使回缩严重的内侧肩袖撕裂组织的活动度得到最大程度的改善。有些仍难以覆盖足印区,可采用边缘集合技术(margin convergence)^[5],即边对边(side-to-side)缝合,将 U 形撕裂转变为 T 型撕裂或新月形撕裂,降低缝合张力,将撕裂肩袖固定至肱骨大结节的足印区。如果固定时张力仍过大,可适当磨除少量关节面软骨,内移足印区。

4 完全修复术

术中肌腱复位程度和锚钉置入位置影响腱-骨愈合,Ruotolo 等^[6]通过尸体标本测量发现,冈上肌足印区前后径 25 mm,内外侧 14 mm,面积 250 mm²。Karthikeyan 等^[7]利用超声对健康的年轻成年人的肩袖足印面积进行测量,冈上肌足印区最大平均宽度为男性 14.9 mm,女性 13.5 mm。平均厚度为女性 4.9 mm,男性 5.6 mm。因此,在解剖修复时,应覆盖大结节 15 mm 左右的冈上肌腱。

腱骨界面间隙与腱骨愈合有关。Karthikeyan 等^[8]比较了双排与单排的生物力学性能,发现双排比单排最大失败载荷提高 48%,足印区应变减少 66%,腱-骨界面间隙减少 42%。Wang 等^[9]指出单排与双排在功能评分方面没有显著差异,但采用双排修复的患者,术后再撕裂率较低,肩关节活动度和力量较好。

Siskoksy 等^[10]利用尸体标本,比较了类骨道技术和双排技术的最大载荷,分别为 380 N, 285 N,说明类骨道技术能够获得更大的初始固定强度。Park 等^[11]发现联合缝线桥的类骨道技术比双排固定能够显著增加足印区接触面积和接触压力。联合缝线桥的双排修复(双排加压修复技术)也可显著降低再撕裂率,Mihata 等^[12]对大型和 MRCT 患者采用单排修复、标准双排修复、双排加压修复 3 种技术,发现术后再撕裂率分别为 62.5%, 41.7%, 7.5%。

研究认为完全修复在缓解疼痛、提高肌力、改善功能方面效果满意^[13],但与较小的撕裂比起来,MRCT 修复术后临床疗效难预测,撕裂再发率高(25%~57%)^[14,15]。再撕裂危险因素包括:吸烟^[16]、撕裂尺寸、肩袖回缩程度^[13]、肌肉脂肪浸润、

修复张力大、肩-肱距离减少($<4.1\text{ mm}$)^[17]。脂肪浸润程度与肌腱撕裂尺寸显著相关^[18,19],肩袖即使成功修复,脂肪浸润和肌肉萎缩也是不可逆的^[20],可采用核磁共振半定量^[20]或定量^[18]方法评估脂肪浸润的程度,以预估术后功能恢复情况和再断裂风险。

Sano 等^[21]通过比较不同固定方式的压力集中分布,试图从力学角度解释锚钉修复后再撕裂率的原因,研究发现小切口径骨道修复:应力集中在腱-骨侧,滑囊侧无压力;单排修复:应力集中在锚钉所在区域的滑囊侧,且应力最大;双排修复:应力更多集中在内排锚钉,区域的应力集中可能是导致术后再撕裂的始动因素。

尽管术后 MRI 显示有再撕裂,但再撕裂患者功能评分较术前仍显著提高^[22],但完全愈合患者的功能评分优于再撕裂者,平均术后 3.2 年和 7.6 年再撕裂没有进展,这与术前初始撕裂的自然进程不同^[23]。再撕裂与成功修复的患者相比,前者术后发生肩-肱距离减小、肩肱关节炎和肩袖肌肉脂肪变可能性更大^[23]。再撕裂需翻修患者,锚钉置入困难时可考虑小切口的经骨道技术。

5 部分修复术

三角肌为肩关节外展的起动力,凭借三角肌自身就能完成整个外展运动。冈上肌为提高外展持续力和强度的辅助肌。二者构成肩关节的外展力偶,肱二头肌长头腱也有外展肩关节作用。因此,我们临床中可以看到很多 MRCT 但三角肌无萎缩的患者,其肩关节仍具有较好的功能和活动度,原因在于肩袖外展力偶完好,有学者称之为“有功能的损伤肩袖”。

对肌腱回缩程度重、修复张力大、肌腱质量差、肌肉脂肪浸润严重、肱骨头不能完全覆盖的患者,可考虑 Burkhart 等^[24]提出的部分修复技术,即修复肩袖缆,恢复“吊桥”样结构,重建肩关节外展力偶,实现肩关节生物力学平衡。Iagulli 等^[25]比较部分修复和完全修复的临床效果,24 个月时两者功能评分均显著提高,并无显著差异,但 Oh 等^[26]的生物力学研究发现,部分修复未能恢复最大内、外旋,但成功恢复了肱骨头顶端的位置,增加肩-肱距离。

6 补片修复术

对术后内、外旋活动度要求高、不可完全修复的 MRCT 患者,可采用补片修复;对于虽可完全修复的

巨大撕裂,但肌腱质量差、脂肪浸润重、修复张力大、术后有再断裂可能的患者,补片可作为加强材料。补片的材料包括不可吸收材料补片、细胞外基质补片、人工可吸收支架补片,小肠黏膜上皮 (small intestinal submucosa, SIS) 补片等。

Meijden 等^[27]比较采用补片与肌腱加强缝合和不用补片直接修复,均采用双排修复技术,力学结果发现,二者的最大失败载荷没有显著差异。但 Shea 等^[28]采用同样的模型发现,补片加强组的腱-骨界面间隙下降了 40%,对脂肪浸润程度较低的 MRCT 患者,分别进行自体阔筋膜补片修复术和部分修复术,随访 35 个月,二者功能评分均显著提高,但补片组优于部分修复组,再撕裂率分别为 8.3% 和 41.7%,但对于浸润程度严重的巨大撕裂,术后效果不理想^[29]。对合并二头肌长头腱病变需行切断或固定的患者,有学者^[30]将二头肌腱近端切断,将其与冈上肌缝合桥接联合固定,加强冈上肌肌力,术后肩关节活动度和功能得到良好改善。

Ji 等^[31]采用 SIS 补片修复大型和巨大慢性肩袖撕裂,术后愈合率和临床结果无显著提高,但诸多研究报告临床结果良好:左旋聚乳酸可吸收补片^[32]、猪真皮胶原^[33]、自体阔筋膜^[34],补片种类与临床结果相关。

7 上关节囊重建术

肩关节囊是盂肱关节重要的静态稳定结构,冈上肌或冈下肌撕裂通常合并上关节囊损伤。生物力学研究发现上关节囊缺失将导致盂肱关节在各个方向上位移增加,特别是在外展 5° 和 30° 时,上方移位最显著^[35]。

Mihata 等^[36]对不能解剖修复的 MRCT 患者,采用自体阔筋膜重建上关节囊,术后随访 2 年,ASES 功能评分显著增加,肌力显著改善,肌肉无萎缩,肩-肱距离显著增加,肌腱或移植物撕裂再发率仅为 16.7%。上关节囊重建可作为治疗不能完全修复的 MRCT 的一种新的有效的手术方式。

综上所述,目前关节镜修复 MRCT 的手术方案仍有争议。老年 MRCT 修复难度大,对外科医师仍是挑战。

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