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·临床研究·

钛丝环扎固定外侧壁联合股骨近端防旋髓内钉治疗 AO/OTA 31-A3 型股骨转子间骨折的临床疗效

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[摘 要] **目的** 探讨钛丝环扎固定外侧壁联合股骨近端防旋髓内钉治疗 AO/OTA 31-A3 型股骨转子间骨折的临床疗效。**方法** 选取我院收治的 AO/OTA31-A3 型股骨转子间骨折患者 20 例,所有患者均行钛丝环扎固定外侧壁联合股骨近端防旋髓内钉治疗。记录患者手术时间、术中失血量及围术期并发症发生情况。术后 X 射线观察骨折愈合情况,术前及术后 12 个月采用视觉模拟量表(VAS)评估骨折部位疼痛情况,采用 Harris 评分评估髋关节功能。**结果** 所有患者手术均顺利完成,手术时间平均(2.25±0.90)h;术中失血量平均(403.28±204.56)mL。术后 12 个月 VAS 评分为(1.03±0.54)分,低于术前的(7.35±1.32)分,差异有统计学意义($t=9.335$,$P<0.001$)。术后 12 个月 Harris 评分为(88.65±5.89)分,高于术前的(38.20±7.42)分,差异有统计学意义($t=-24.320$,$P<0.001$)。所有患者均未发生伤口感染及不愈合、关节周围神经血管损伤、内固定失败等并发症。**结论** 使用钛丝环扎固定外侧壁联合股骨近端防旋髓内钉治疗 AO/OTA 31-A3 型股骨转子间骨折并发症较少,骨折断端对位良好,复位稳定,能促进骨折早期愈合,临床疗效满意。

[关键词] 转子间骨折;钛丝;股骨近端防旋髓内钉;外侧壁

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Clinical outcome of fixing lateral wall with titanium-wire cerclage combined with proximal femoral nail antirotation in the treatment of AO/OTA 31-A3 femoral intertrochanteric fracture

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Abstract: Objective To explore the clinical outcome of fixing lateral wall with titanium-wire cerclage combined with proximal femoral nail antirotation in the treatment of AO/OTA 31-A3 femoral intertrochanteric fracture. **Methods** A total of 20 patients with AO/OTA 31-A3

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femoral intertrochanteric fracture treated in our hospital were selected, and all of them were treated with fixing lateral wall with titanium-wire cerclage combined with proximal femoral nail antirotation. The operation time, intraoperative blood loss and perioperative complications were recorded. The fracture healing after operation was observed by X-ray examination. The visual analogue scale (VAS) was used to evaluate the pain at the fracture site and Harris score was used to evaluate the hip function before operation and 12 months after operation. **Results** The operations of all patients were completed successfully, with an average operation time of (2.25 ± 0.90) hours and an average intraoperative blood loss of (403.28 ± 204.56) mL. The VAS score 12 months after operation was lower than that before operation (1.03 ± 0.54 *vs.* 7.35 ± 1.32), with statistically significant difference (t = 9.335, P < 0.001). The Harris score 12 months after operation was higher than that before operation (88.65 ± 5.89 *vs.* 38.20 ± 7.42), with statistically significant difference (t = −24.320, P < 0.001). There was no wound infection or nonunion, peripheral nerve or vascular injury or internal fixation failure occurred in all patients. **Conclusion** Fixing lateral wall with titanium-wire cerclage combined with proximal femoral nail antirotation in the treatment of AO/OTA 31-A3 femoral intertrochanteric fracture has fewer complications, good alignment of fracture ends and stable reduction, which can promote the early healing of fracture with satisfactory clinical effect.

Keywords: femoral intertrochanteric fracture; titanium-wire cerclage; proximal femoral nail antirotation; lateral wall

目前我国正进入人口老龄化的阶段，髋部骨折的发生率逐年增高[1]。老年股骨转子间骨折是最常见的骨质疏松性髋部骨折，保守治疗常常疗效不佳，是致残的主要原因[2]。对于不稳定型股骨转子间骨折，髓内钉固定系统更为合适。而以股骨近端防旋髓内钉为主的髓内固定近年来得到了广泛的应用[3-4]。随着老年股骨转子间骨折手术患者的增加，内固定失败的报道也日益增多[5-6]。AO/OTA31-A3 型股骨转子间骨折为不稳定型骨折，骨折线累及股骨外侧壁，是股骨转子间骨折固定失败再次手术的重要危险因素[7-8]，故对于该类型骨折固定外侧壁则非常必要。而以往单纯的股骨近端防旋髓内钉很难复位固定外侧壁，骨折固定的稳定性不佳。本研究在股骨近端防旋髓内钉周围使用钛丝环扎固定外侧壁治疗 AO/OTA 31-A3 型股骨转子间骨折术后疗效满意，髋关节恢复良好，并发症少，现报道如下。

1 资料与方法

1.1 临床资料

选取 2018 年 6 月至 2021 年 5 月我院收治的股骨转子间骨折患者 20 例，其中男 7 例，女 13 例；年龄 65～75岁，平均(68.2 ± 4.7)岁；经 X 射线及 CT 等影像学检查显示存在外侧壁骨折，符合 AO/OTA 31-A3 型骨折。排除陈旧性骨折(1 个月以上)、病理性骨折、多发骨折或术前不能行走的患者。本研究经我院伦理委员会批准(亳医伦审 2023 第 38 号)，患者均对手术知情并签署知情同意书。

1.2 方法

患者采用全身麻醉，仰卧在牵引床上，对侧肢体取半截石位，便于获取前后位和侧位透视图像。经牵引复位后透视见患者外侧壁仍有较大分离，遂先行外侧壁固定重建。

在大腿近端大转子外侧切开皮肤和皮下组织，并保留外侧大转子软组织袖。术中通过 C 型臂 X 射线透视确定外侧壁的形态，无需完全暴露骨折。双股钛丝捆绑环扎外侧壁与骨干，直视骨折复位满意后，钛丝收紧固定。在髂前上棘水平下方及转子顶点近端作一约 5 cm 的皮肤切口，切开皮下组织和筋膜，暴露股骨大转子顶部，开口器于合适位置开口后插入导针，轻轻扩孔后，插入股骨近端防旋髓内钉主钉，打入导针，透视下行骨折复位，导针位置满意后打入合适长度的螺旋刀片，远端拧入锁定螺钉，透视满意后冲洗伤口，间断缝合伤口，无菌纱布敷料包扎固定(图 1)。

1.3 观察指标

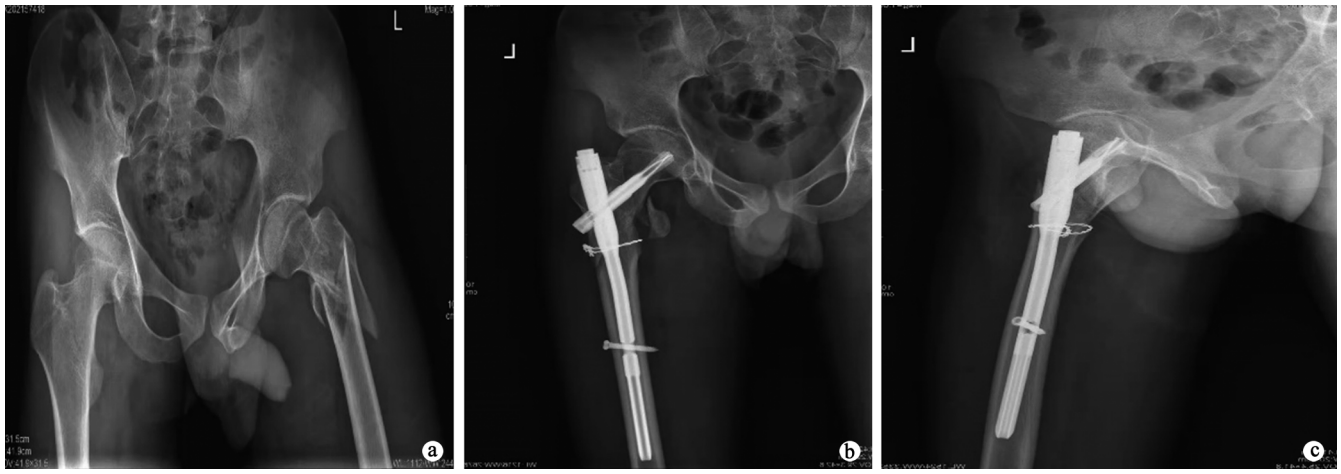
记录患者手术时间、术中失血量及围术期并发症发生情况。术后 X 射线复查观察骨折愈合情况。术前及术后 12 个月采用视觉模拟量表(visual analogue scale, VAS)评估骨折部位疼痛情况，采用 Harris 评分评估髋关节功能。

1.4 统计学方法

采用 SPSS 21.0 软件进行统计学分析，计量资料以均数 ± 标准差($\bar{x} \pm s$)表示，不同时间点比较采用配对设计 t 检验，检验水平 α 取双侧 0.05。P < 0.05 为差异有统计学意义。

2 结果

患者手术均顺利完成，手术时间 1.2～3.1 h，平均(2.25 ± 0.90) h；术中失血量为 150～750 mL，平均(403.28 ± 204.56) mL；术中及术后均无输血病例。所有患者围术期均未出现伤口感染或不愈合、关节周围神经血管损伤、内固定失败等并发症。



a:术前骨折累及外侧壁;b:术中所见;c:术后断端对位对线良好,复位质量佳

图1 手术前后图片

患者术后随访8~16个月,髋关节功能恢复满意,疼痛均明显缓解。患者术前VAS评分为(7.35±1.32)分,术后12个月降至(1.03±0.54)分,手术前后比较差异具有统计学意义($t=9.335$,$P<0.001$)。患者术前Harris评分为(38.20±7.42)分,术后12个月升高至(88.65±5.89)分,手术前后比较差异具有统计学意义($t=-24.320$,$P<0.001$)。

术后复查X射线示:14例患者骨折断端基本解剖复位,骨折断端对位好;6例对位稍差,但整体力线好。末次随访时,复查X射线见患者骨折均骨性愈合,可完全负重行走。

3 讨论

目前多数学者认为股骨近端外侧壁是一个外科概念,其确切的解剖位置尚无定论[9]。而股骨近端外侧壁是否完整对于内固定物的选择至关重要,若外侧壁缺失会使骨折更加不稳定,明显增加手术失败率及围术期并发症发生率[10]。因而,越来越多的临床工作者将研究重点放在了外侧壁上,并将外侧壁的重建作为不稳定型股骨转子间骨折恢复良好的一个重要指标[11-12]。

外侧壁骨折时其骨折线常呈纵形,骨折块向内侧倾斜,在生物力学上将导致单纯的股骨转子间骨折转为不稳定的股骨转子下骨折[13]。Pradeep等[14]发现,在外侧壁完整的情况下,髓内钉内固定装置是理想的植入物。髓内钉内固定装置作为一种负荷分担装置,具有较小的力矩,因此允许髋关节早期屈伸活动,并能防止股骨头塌陷和髋内翻畸形。但髓内钉内固定装置只能提供后内侧支撑防止塌陷移位,并不能弥补外侧壁骨折造成的支撑缺失。单用髓内钉固定更容易发生髋内翻、股骨头塌陷和螺钉移位脱落等,最终导致内固定植入失败,可见固定外侧壁的必要性。

目前固定外侧壁最常用的是大转子锁定钢板、环扎钢丝或螺钉。Gupta等[15]探讨了大转子锁定钢板在外侧壁重建中的应用,结果显示,在滑动髋螺钉中联用大转子锁定钢板比单独使用滑动髋螺钉效果更好。但滑动髋螺钉可能不适用于所有不稳定型骶骨转子间骨折,尤其是外侧壁冠状位骨折,受髓内钉主钉的影响,钢板上的锁定螺钉打入难度大,且纵向切开复位植入钢板的创伤大,而环扎钢丝或钛丝则可完美解决此类问题。有研究报道,与滑动髋螺钉相比,使用环扎钢丝或螺钉联合股骨近端防旋髓内钉固定外侧壁可减少髋内翻畸形和股骨头塌陷的发生,对于外侧壁冠状位骨折的患者更为适合[16-17]。Gadegone等[16]使用带垫圈的松质骨螺钉固定外侧壁,使其远离髓内钉及螺旋刀片的通道,但螺钉的放置对操作者要求较高,需具备一定的经验。若患者骨质疏松严重,使用螺钉固定可能会将外侧壁压碎,导致退钉。Kulkarni等[17]使用钢丝环扎来固定外侧壁,手术并发症发生率较低,骨折愈合质量和髋关节功能恢复良好。

Kim等[18]在对不稳定型骶骨转子间骨折的研究中强调了术前使用CT扫描识别外侧壁骨折的重要性,并认为使用股骨近端防旋髓内钉联合钢丝环扎固定外侧壁骨折,可明显提高骨折固定的稳定性。Wang等[19]比较了使用钢板与钢丝环扎固定外侧壁的效果,结果显示,使用钢板固定的患者骨折愈合更快,但钢板的放置需完全解剖显露断端,手术时间较长,出血量较多,可能增加伤口感染和不愈合发生率;在外侧壁粉碎性骨折合并重度骨质疏松时,依然有螺钉把持力不够、钢板再次移位的风险。

本研究对20例合并外侧壁骨折的股骨转子间骨折患者采用双股钛丝环扎固定重建外侧壁,维持外侧

壁的支撑;使用钛丝便于患者将来行核磁共振检查时不受影响。使用钛丝固定骨折断端复位质量明显提高,患者术后 VAS 评分降低,疼痛较术前明显减轻,术后 Harris 评分较术前明显提高,骨折愈合良好,并发症少,髋内翻畸形和股骨头塌陷可控,临床疗效满意;末次随访时所有骨折均骨性愈合,患者可完全负重行走。钛丝环扎复位固定外侧壁的优点是术中保留骨折的生物力学环境,不破坏髋关节外侧软组织袖及周围微循环。

综上,在治疗 AO/OTA 31-A3 型股骨转子间骨折时,使用钛丝环扎固定外侧壁联合股骨近端防旋髓内钉并发症少,骨折断端对位良好,复位稳定,能促进骨折早期愈合,患者可进行早期康复训练。但本研究还存在以下不足之处:①本研究为回顾性分析,偏倚风险较高;②样本量小,随访时间不长,远期效果需进一步研究证实。

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