

doi: 10.13241/j.cnki.pmb.2020.07.018

## 不同入路手术对骨盆髌臼骨折患者骨折复位质量、髋关节功能及炎症因子的影响\*

韩 力 赵建文 王晓伟 何红英 吴 卓 张建政<sup>△</sup>

(中国人民解放军总医院第七医学中心骨科 北京 100700)

**摘要** 目的:探讨不同入路手术对骨盆髌臼骨折患者骨折复位质量、髋关节功能及炎症因子的影响。方法:回顾性分析 2016 年 7 月~2018 年 12 月期间我院收治的 91 例骨盆髌臼骨折患者的临床资料,根据入路方式的不同将其分为 A 组( $n=44$ ,髂腹股沟入路)和 B 组( $n=47$ ,改良 Stoppa 入路),比较两组患者复位质量、围术期指标、髋关节功能及炎症因子水平,记录两组患者随访期间并发症发生情况。结果:B 组术中出血量少于 A 组,手术切口长度短于 A 组( $P<0.05$ );两组手术显露时间比较差异无统计学意义( $P>0.05$ )。B 组的骨折复位优良率为 85.11%(40/47),高于 A 组的 65.91%(29/44)( $P<0.05$ )。与术前相比,两组患者出院时、术后 6 个月的改良 Postel 评分成逐渐升高趋势( $P<0.05$ );两组患者术前、出院时、术后 6 个月的改良 Postel 评分组间比较差异无统计学意义( $P>0.05$ )。两组患者术后 7 d 血清白介素-6(IL-6)、降钙素原(PCT)水平均高于术前,但 B 组低于 A 组( $P<0.05$ )。B 组随访期间并发症发生率低于 A 组( $P<0.05$ )。结论:改良 Stoppa 入路手术与髂腹股沟入路手术均可改善骨盆髌臼骨折患者髋关节功能,但经改良 Stoppa 入路手术者骨折复位质量更佳,创伤更小,炎症反应更轻,同时还可减少并发症发生率。

**关键词:**改良 Stoppa 入路手术;髂腹股沟入路手术;骨盆髌臼骨折;骨折复位质量;髋关节功能;炎症因子

**中图分类号:**R683.3 **文献标识码:**A **文章编号:**1673-6273(2020)07-1289-04

## Effects of Different Approaches on Reduction Quality, Hip Function and Inflammatory Factors in Patients with Pelvic and Acetabular Fractures\*

HAN Li, ZHAO Jian-wen, WANG Xiao-wei, HE Hong-ying, WU Zhuo, ZHANG Jian-zheng<sup>△</sup>

(Department of Orthopaedics, The Seventh Medical Center of Chinese People's Liberation Army General Hospital, Beijing, 100700, China)

**ABSTRACT Objective:** To investigate the effects of different approaches on the reduction quality, hip function and inflammatory factors of patients with pelvic and acetabular fractures. **Methods:** The clinical data of 91 patients with pelvic and acetabular fractures who were admitted to our hospital from July 2016 to December 2018 were analyzed retrospectively. According to the different approaches, they were divided into group A ( $n=44$ , ilioinguinal approach) and group B ( $n=47$ , modified Stoppa approach). The reduction quality, perioperative indexes, hip joint function and inflammatory factors were compared between the two groups. The complications of the two groups were recorded during the follow-up. **Results:** The intraoperative hemorrhage in group B was less than that in group A, the length of incision was shorter than that in group A ( $P<0.05$ ). There was no significant difference in operative exposure time between the two groups( $P>0.05$ ). The excellent and good rate of fracture reduction in group B was 85.11% (40/47), which was higher than 65.91% (29/44) in group A ( $P<0.05$ ). Compared with before treatment, the modified Postel scores of the two groups increased gradually at the time of discharge and 6 months after operation ( $P<0.05$ ). There was no significant difference between the two groups in the modified Postel score before operation, at the time of discharge and 6 months after operation ( $P>0.05$ ). The serum levels of interleukin-6 (IL-6), procalcitonin (PCT) in the two groups at 7d after operation were higher than those before operation, but those in group B were lower than those in group A ( $P<0.05$ ). The incidence of complications in group B was lower than that in group A ( $P<0.05$ ). **Conclusion:** Both the modified Stoppa approach and the ilioinguinal approach can improve the hip joint function of patients with pelvic and acetabular fractures, but the improved Stoppa approach has better quality of fracture reduction, less trauma, less inflammatory response, and it can also reduce the incidence of complications.

**Key words:** Modified Stoppa approach; Ilioinguinal approach; Pelvic and acetabular fractures; Fracture reduction quality; Hip function; Inflammatory factors

**Chinese Library Classification(CLC):** R683.3 **Document code:** A

**Article ID:** 1673-6273(2020)07-1289-04

\* 基金项目:中央军委后勤保障部重点项目(BLJ18J006)

作者简介:韩力(1980-),男,本科,主治医师,研究方向:创伤骨科,E-mail: hanli9950110@126.com

<sup>△</sup> 通讯作者:张建政(1973-),男,博士,主任医师,研究方向:骨盆髌臼,E-mail: drzhangjianzheng@126.com

(收稿日期:2019-10-23 接受日期:2019-11-17)

## 前言

骨盆骨折和髌臼骨折多为高能量损伤,两者常常同时出现,患者疼痛感强,较难治疗且术后致残率高<sup>[1,2]</sup>。目前临床针对骨盆髌臼骨折患者的治疗多为手术治疗,入路方式正确有利于顺利进行手术,提高骨折复位质量并减少术后并发症的发生率,故探讨骨盆髌臼骨折患者合理的入路方式对于改善患者预后具有积极的临床意义<sup>[3,4]</sup>。髌腹股沟入路手术是治疗骨盆髌臼骨折的金标准,可以满足骨折显露和固定的需要,临床应用广泛<sup>[5]</sup>,但不少临床实践也发现该入路方式存在手术创伤大、解剖复杂、对术者操作水平要求高等不足<sup>[6,7]</sup>。改良 Stoppa 入路手术是近年来用于治疗骨盆髌臼骨折的新型入路方式,其手术视野清晰、手术操作安全、创伤小<sup>[8]</sup>。现临床有关骨盆髌臼骨折患者应用何种入路方式仍存在一定争议,本研究就此展开分析,以期骨盆髌臼骨折患者的入路方式的选择提供数据参考。

## 1 资料与方法

### 1.1 基线资料

回顾性分析我院收治的骨盆髌臼骨折患者 91 例(病例选取时间:2016 年 7 月~2018 年 12 月)的临床资料,纳入标准:(1)均经 CT 等临床影像学检查确诊;(2)均符合手术指征;(3)均为新鲜骨折,骨折时间<2 周;(4)临床资料完整者;(5)患者及其家属知情本次研究且签署了同意书;(6)均由同一组医师完成手术操作。排除标准:(1)合并心肝肺肾等脏器严重障碍者;(2)合并糖尿病及代谢性疾病者;(3)合并骨肿瘤、先天性成骨不全或其他可引发病理性骨折的疾病;(4)存在精神障碍,无法配合完成本次治疗者。上述患者根据入路方式的不同将其分为 A 组(n=44,髌腹股沟入路)和 B 组(n=47,改良 Stoppa 入路),其中 A 组男 24 例,女 20 例,年龄 25~61 岁,平均(39.83±4.26)岁;骨折时间 0.2~2 周,平均(1.06±0.24)周;致伤原因:交通伤 18 例,重物砸伤 13 例,坠落伤 13 例;骨折 Tile 分型:Tile B 型 25 例,Tile C 型 19 例;Letournel 分型:前柱骨折 8 例,横行骨折 12 例,T 形骨折 11 例,双柱骨折 13 例。B 组男 26 例,女 21 例,年龄 27~58 岁,平均(39.06±5.46)岁;骨折时间 0.4~2 周,平均(1.13±0.32)周;致伤原因:交通伤 20 例,重物砸伤 14 例,坠落伤 13 例;骨折 Tile 分型:Tile B 型 27 例,Tile C 型 20 例;Letournel 分型:前柱骨折 10 例,横行骨折 13 例,T 形骨折 12 例,双柱骨折 12 例。两组一般资料对比无差异( $P>0.05$ )。

### 1.2 方法

A 组取仰卧位,腰麻,切口取自髌嵴前 2/3 处,起止点分别为髌前上棘以及耻骨联合上方约 2 cm,通过剥离腹外斜肌腱和髌肌附着点以暴露髌髌关节前方,于耻骨联合上方切断联合肌腱和腹直肌鞘,将牵引带从腹股沟韧带下面穿过股髌腰肌和神经束,切开髌髌筋膜,暴露骨折断端,采用专用器械帮助骨折复位,采用重建钢板塑型,C 臂机下钻孔放置螺钉,固定满意后冲洗伤口,常规放置引流管,缝合伤口。B 组取仰卧位,全麻后,取下腹部正中位置作一 9~12 cm 的切口,沿腹白线将腹直肌分离,钝性分离腹膜外间隙,直至暴露耻骨联合至髌髌关节的真骨盆边缘、四边体上部,剥离耻骨支或四边体部分的骨膜,充分暴露髌臼骨折端或骨盆耻骨支,将骨折复位,骨折复位满意后放置弧形钢板,C 臂机下钻孔放置螺钉,固定满意后冲洗伤口,常规放置引流管,缝合伤口。术后常规抗感染、抗炎,引流管留置 2~3 d,并常规过渡下肢关节肌肉功能锻炼、患侧肢体部分负重及完全负重、借助拐杖下床活动。术后以门诊复查的方式随访 6 个月。

### 1.3 观察指标

(1)记录两组手术显露时间、术中出血量、手术切口长度。(2)术后 3d,根据 Matta 影像学评分<sup>[9]</sup>评价患者复位质量,具体如下:术后骨折块分离最大距离>20 mm 为差,11~20 mm 为可,4~10 mm 为良,<4 mm 为优。优良率=优率+良率。(3)于术前、术后 7 d 抽取患者清晨空腹静脉血 4 mL,经离心半径 5 cm,3500 r/min 离心 12 min,分离待测。采用酶联免疫吸附试验检测白介素-6(Interleukin-6,IL-6)、降钙素原(Procalcitonin,PCT),严格遵守试剂盒(深圳晶美生物科技有限公司)说明书进行操作。(4)记录两组随访期间的并发症。(5)于术前、出院时、术后 6 个月采用改良 Postel 评分<sup>[10]</sup>系统评价患者髌髌关节功能,其中改良 Postel 评分系统包括步态、髌髌关节活动度以及疼痛,分数 0~18 分,分数越高越好。

### 1.4 统计学方法

研究数据录入 SPSS24.0 软件处理。计数资料以(%)表示,行卡方检验。用( $\bar{x} \pm s$ )表示计量资料,行 t 检验。 $\alpha=0.05$  为检验水准。

## 2 结果

### 2.1 围术期指标比较

B 组术中出血量少于 A 组,手术切口长度短于 A 组( $P<0.05$ );两组手术显露时间比较无差异( $P>0.05$ );详见表 1。

表 1 围术期指标比较( $\bar{x} \pm s$ )

Table 1 Comparison of perioperative indexes( $\bar{x} \pm s$ )

| Groups        | Operative exposure time(min) | Intraoperative hemorrhage(mL) | Length of incision(cm) |
|---------------|------------------------------|-------------------------------|------------------------|
| Group A(n=44) | 17.91± 3.43                  | 633.50± 12.57                 | 13.29± 1.01            |
| Group B(n=47) | 16.75± 3.89                  | 574.10± 15.83                 | 10.17± 0.66            |
| t             | 1.505                        | 19.736                        | 17.553                 |
| P             | 0.136                        | 0.000                         | 0.000                  |

### 2.2 骨折复位质量比较

B 组的骨折复位优良率为 85.11%(40/47),高于 A 组的

65.91%(29/44)( $P<0.05$ );详见表 2。

表 2 骨折复位质量比较 例(%)

Table 2 Comparison of fracture reduction quality n(%)

| Groups        | Excellent | Good      | Approve  | Bad      | Excellent and good rate |
|---------------|-----------|-----------|----------|----------|-------------------------|
| Group A(n=44) | 11(25.00) | 18(40.91) | 9(20.45) | 6(13.64) | 29(65.91)               |
| Group B(n=47) | 16(34.04) | 24(51.06) | 5(10.64) | 2(4.25)  | 40(85.11)               |
| $\chi^2$      |           |           |          |          | 4.573                   |
| <i>P</i>      |           |           |          |          | 0.032                   |

## 2.3 髋关节功能比较

与术前相比,两组患者出院时、术后 6 个月的改良 Postel 评分成逐渐升高趋势( $P<0.05$ );两组患者术前、出院时、术后 6

个月的改良 Postel 评分组间比较差异无统计学意义( $P>0.05$ );详见表 3。

表 3 髋关节功能比较( $\bar{x}\pm s$ ,分)Table 3 Comparison of hip joint function ( $\bar{x}\pm s$ , scores)

| Groups        | Before operation | Time of discharge             | 6 months after operation       |
|---------------|------------------|-------------------------------|--------------------------------|
| Group A(n=44) | 1.35 $\pm$ 0.26  | 12.57 $\pm$ 1.87 <sup>a</sup> | 16.24 $\pm$ 1.26 <sup>ab</sup> |
| Group B(n=47) | 1.41 $\pm$ 0.31  | 13.05 $\pm$ 1.51 <sup>a</sup> | 16.51 $\pm$ 1.23 <sup>ab</sup> |
| <i>t</i>      | 0.997            | 1.351                         | 1.304                          |
| <i>P</i>      | 0.322            | 0.180                         | 0.304                          |

Note: compared with before operation, <sup>a</sup> $P<0.05$ ; compared with time of discharge, <sup>b</sup> $P<0.05$ .

## 2.4 炎症因子水平比较

两组术前血清 IL-6、PCT 水平比较无差异( $P>0.05$ );术后

7 d 两组血清 IL-6、PCT 水平均高于术前,但 B 组较 A 组低( $P<0.05$ );详见表 4。

表 4 炎症因子水平比较( $\bar{x}\pm s$ )Table 4 Comparison of inflammatory factors ( $\bar{x}\pm s$ )

| Groups        | IL-6(pg/mL)      |                     | PCT(ng/mL)       |                     |
|---------------|------------------|---------------------|------------------|---------------------|
|               | Before operation | 7 d after operation | Before operation | 7 d after operation |
| Group A(n=44) | 28.05 $\pm$ 3.28 | 93.08 $\pm$ 4.26    | 3.91 $\pm$ 0.89  | 10.54 $\pm$ 1.21    |
| Group B(n=47) | 27.58 $\pm$ 4.12 | 62.97 $\pm$ 5.31    | 4.06 $\pm$ 0.94  | 7.49 $\pm$ 1.23     |
| <i>t</i>      | 0.599            | 29.710              | 0.780            | 11.914              |
| <i>P</i>      | 0.555            | 0.000               | 0.437            | 0.000               |

## 2.5 并发症发生情况比较

A 组随访期间出现 4 例骨折不愈合、2 例深静脉血栓、2 例膀胱破裂,并发症发生率为 18.18%(8/44),B 组随访期间出现 1 例骨折不愈合、1 例深静脉血栓,并发症发生率为 4.26%(2/47),B 组随访期间并发症发生率低于 A 组( $\chi^2=4.506$ , $P=0.034$ )。

## 3 讨论

骨盆骨折多为严重间接性外伤或挤压伤,而髋臼骨折多是因骨盆骨折进而波及髋臼部位,造成连带性骨折<sup>[11,12]</sup>。骨盆髋臼骨折患者局部疼痛剧烈,活动能力受限,若未能及时予以治疗,则可留下终身残疾,甚至威胁患者生命<sup>[13,14]</sup>。选择合适手术入路是手术获得良好预后的关键前提,如何充分显露骨折断端一直是临床骨科医生面临的难题之一。复杂髋臼骨折难度较大,主要是因为需在良好复位的前提下做到切口入路最优化。髂腹股沟入路是治疗骨盆髋臼骨折的常用前侧入路,该治疗方法优点显著,在临床应用广泛<sup>[15]</sup>,同时其也存在需要解剖腹股沟管等重要血管神经组织,创伤大、术中无法直视下复位骨折等诸多

不足,此外,髂腹股沟入路较难掌握,易发生并发症<sup>[16-18]</sup>。改良 Stoppa 入路从腹膜外进入骨盆内部,可将整个真骨盆缘全程显露于术野,为术者提供更为完整的信息<sup>[19]</sup>。

本次研究结果显示,与术前相比,两组术后不同时间点的改良 Postel 评分成逐渐升高趋势,但组间比较无差异,可见改良 Stoppa 入路手术与髂腹股沟入路手术均效果显著,可有效改善患者髋关节功能,两种手术均可顺利完成,术后恢复满意。同时 B 组术中出血量、手术切口长度、并发症发生率等方面均优于 A 组,可见改良 Stoppa 入路手术创伤小,安全性高。这与李宝丰<sup>[20]</sup>等研究结果一致。这主要是因为改良 Stoppa 入路属于骨盆前入路,术中无需显露腹股沟管、股动静脉、股神经等重要血管神经组织,可直接暴露骨折断端,并可同时完成双侧髋臼和骨盆的固定<sup>[21-23]</sup>。同时本次研究结果还显示, B 组的骨折复位优良率高于 A 组,可见改良 Stoppa 入路手术者骨折复位质量更佳,这主要是因为该入路方式可将整个真骨盆缘全程显露于术野,对四边体骨折内后旋转移位的暴露更好,可在直视下对骨折进行复位,固定更可靠,不仅可减小对软组织的干预及创伤,也可使移位骨化率降低,进而提高骨折复位质量<sup>[24-26]</sup>。而黄

勇明<sup>[27]</sup>等学者研究却认为,改良 Stoppa 入路手术与髂腹股沟入路手术的骨折复位优良率比较无差异,与本次研究结果存在一定差异,这可能是由于样本量受限或者存在个体化差异所致,后续报道将扩大样本量,严格控制筛选标准以获取更为准确的数据。IL-6 是多功能炎症细胞因子,具有致炎和抗炎的双向功能,正常情况下的水平对机体有利,而分泌过多则会引起一系列炎症损害<sup>[28]</sup>。PCT 是一种全身性细菌感染标志物,具有极高的敏感度和特异度,可反映机体炎症严重程度<sup>[29]</sup>。本研究中两组患者术后 7d 血清 IL-6、PCT 水平均高于术前,但 B 组低于 A 组,这可能与改良 Stoppa 入路手术时间较短、创伤小等能够限制炎症反应发生密切相关<sup>[30]</sup>。

综上所述,骨盆髌臼骨折患者采用改良 Stoppa 入路手术与髂腹股沟入路手术均可有效改善患者髋关节功能,但经改良 Stoppa 入路手术者骨折复位质量更佳,炎症反应轻,创伤小,同时还可减少并发症发生率,临床应用价值较高。

#### 参考文献(References)

- [1] Purcell KF, Bergin PF, Spitler CA, et al. Management of Pelvic and Acetabular Fractures in the Obese Patient [J]. *Orthop Clin North Am*, 2018, 49(3): 317-324
- [2] Molière S, Dosch JC, Bierry G. Pelvic, acetabular and hip fractures: What the surgeon should expect from the radiologist [J]. *Diagn Interv Imaging*, 2016, 97(7-8): 709-723
- [3] Cai L, Lou Y, Guo X, et al. Surgical treatment of unstable pelvic fractures with concomitant acetabular fractures [J]. *Int Orthop*, 2017, 41(9): 1803-1811
- [4] Whiting PS, Anderson DR, Galat DD, et al. State of Pelvic and Acetabular Surgery in the Developing World: A Global Survey of Orthopaedic Surgeons at Surgical Implant Generation Network (SIGN) Hospitals[J]. *J Orthop Trauma*, 2017, 31(7): e217-e223
- [5] Wang XJ, Lu Li, Zhang ZH, et al. Iliioinguinal approach versus Stoppa approach for open reduction and internal fixation in the treatment of displaced acetabular fractures: A systematic review and meta-analysis [J]. *Chin J Traumatol*, 2017, 20(4): 229-234
- [6] Tosounidis TH, Giannoudis VP, Kanakaris NK, et al. The Iliioinguinal Approach: State of the Art[J]. *JBJS Essent Surg Tech*, 2018, 8(2): e19
- [7] Meena S, Sharma PK, Mittal S, et al. Modified Stoppa Approach versus Iliioinguinal Approach for Anterior Acetabular Fractures; A Systematic Review and Meta-Analysis [J]. *Bull Emerg Trauma*, 2017, 5(1): 6-12
- [8] Verbeek DO, Ponsen KJ, van Heijl M, et al. Modified Stoppa approach for operative treatment of acetabular fractures: 10-year experience and mid-term follow-up[J]. *Injury*, 2018, 49(6): 1137-1140
- [9] 付忠泉, 陈健荣, 褚天航, 等. 改良 Stoppa 入路在髌臼及骨盆骨折手术治疗中的应用[J]. *实用医院临床杂志*, 2019, 16(5): 119-121
- [10] 严广斌. Merle D' Aubigné and Postel 评分系统[J]. *中华关节外科杂志(电子版)*, 2014, 8(6): 827-827
- [11] Gordon WT, Fleming ME, Johnson AE, et al. Pelvic Fracture Care[J]. *Mil Med*, 2018, 183(suppl\_2): 115-117
- [12] Kizkapan TB, Misir A, Uzun E, et al. Comparison of acetabulum posterior wall fractures and fracture dislocations: dislocation does not affect clinical and radiological outcomes [J]. *Acta Orthop Belg*, 2018, 84(2): 117-120
- [13] Sen RK, Rommens PM. Focus on pelvis and acetabulum [J]. *Eur J Trauma Emerg Surg*, 2015, 41(4): 333-334
- [14] Soni A, Gupta R, Sen R. Modified Stoppa Approach for Acetabulum Fracture: A Review [J]. *Rev Bras Ortop (Sao Paulo)*, 2019, 54(2): 109-117
- [15] Chen K, Ji Y, Huang Z, et al. Single Modified Iliioinguinal Approach for the Treatment of Acetabular Fractures Involving Both Columns[J]. *J Orthop Trauma*, 2018, 32(11): e428-e434
- [16] Gänsslen A, Grechenig ST, Nerlich M, et al. Standard Approaches to the Acetabulum Part 2: Iliioinguinal Approach [J]. *Acta Chir Orthop Traumatol Cech*, 2016, 83(4): 217-222
- [17] Gittings DJ, Dattilo JR, Fryhofer G, et al. Treatment of Hip Flexion Contractures with Psoas Recession Through the Middle Window of the Iliioinguinal Approach[J]. *JBJS Essent Surg Tech*. 2017, 7(3): e25
- [18] Guimarães JAM, Rocha VMD, Barcellos ALL. Posterior sacroiliac osteotomy: an alternative to the ilioinguinal approach for pelvic reconstruction in misalignment lesions [J]. *Rev Bras Ortop*, 2017, 52(Suppl 1): 63-68
- [19] Akgul T, Coskun O, Korkmaz M, et al. A Minimally Invasive Technique Using a Modified Stoppa Approach for Periacetabular Osteotomy: A Preliminary Cadaveric Study [J]. *Indian J Orthop*, 2017, 51(6): 687-691
- [20] 李宝丰, 陈蓓, 李梅, 等. 应用改良 Stoppa 入路手术治疗骨盆髌臼骨折的疗效分析 [J]. *中国骨与关节损伤杂志*, 2016, 31(10): 1009-1011
- [21] Elmadağ M, Uzer G, Yıldız F, et al. Safety of modified Stoppa approach for Ganz periacetabular osteotomy: A preliminary cadaveric study[J]. *Acta Orthop Traumatol Turc*, 2016, 50(4): 409-414
- [22] Kim JW, Shon HC, Park JH. Injury of the obturator nerve in the modified Stoppa approach for acetabular fractures [J]. *Orthop Traumatol Surg Res*, 2017, 103(5): 639-644
- [23] Guo HZ, He YF, He WQ. Modified Stoppa Approach for Pelvic and Acetabular Fracture Treatment [J]. *Acta Ortop Bras*, 2019, 27(4): 216-219
- [24] Bastian JD, Savic M, Cullmann JL, et al. Surgical exposures and options for instrumentation in acetabular fracture fixation: Pararectus approach versus the modified Stoppa[J]. *Injury*, 2016, 47(3): 695-701
- [25] Elmadag M, Guzel Y, Aksoy Y, et al. Surgical Treatment of Displaced Acetabular Fractures Using a Modified Stoppa Approach[J]. *Orthopedics*, 2016, 39(2): e340-e345
- [26] Kilinc CY, Acan AE, Gultac E, et al. Treatment results for acetabulum fractures using the modified Stoppa approach [J]. *Acta Orthop Traumatol Turc*, 2019, 53(1): 6-14
- [27] 黄勇明, 何武兵, 许志贤, 等. 改良 Stoppa 入路与髂腹股沟入路手术治疗髌臼骨折疗效比较[J]. *中国骨与关节损伤杂志*, 2018, 33(5): 528-530
- [28] Akbari M, Hassan-Zadeh V. IL-6 signalling pathways and the development of type 2 diabetes [J]. *Inflammopharmacology*, 2018, 26(3): 685-698
- [29] 刘真君, 董伟, 赵丽丽, 等. 血清降钙素原鉴别病毒性感染、一般性细菌感染和重症细菌性感染的临床应用价值[J]. *现代生物医学进展*, 2017, 17(27): 5338-5340, 5384
- [30] 凌健, 尚希福. 改良 Stoppa 入路与髂腹股沟入路治疗骨盆髌臼骨折的疗效比较[J]. *中国矫形外科杂志*, 2017, 25(24): 2286-2289