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微创经皮钢板内固定术与切开复位钢板内固定术治疗胫骨 PILON 骨折疗效比较研究

戴醒明 杨效宁 孙一公 刘大成 李国民

（徐州市第一人民医院骨科 江苏 徐州 221002）

摘要 目的：对比微创经皮钢板内固定术与切开复位钢板内固定术治疗胫骨 PILON 骨折的临床疗效。**方法：**选取 2014 年 11 月-2016 年 1 月在我院接受治疗的胫骨 PILON 骨折患者 76 例，根据乱数表法将患者分为观察组和对照组各 38 例。观察组给予微创经皮钢板内固定术，对照组给予切开复位钢板内固定术，对比两组患者手术时间、术后引流量、术后发热时间、术中出血量、骨折愈合时间、住院时间及并发症发生率，对比两组患者术后 4、8、12 个月膝关节功能评分（HSS）、踝关节功能评分（Baird）。**结果：**观察组手术时间、术后引流量、术后发热时间、术中出血量、骨折愈合时间、住院时间较对照组均显著更少（P<0.05）；观察组术后 4、8、12 个月 HSS 评分和 Baird 评分较对照组显著更高（P<0.05）；观察组总并发症发生率较对照组显著更低（P<0.05）。**结论：**与切开复位钢板内固定术比较，微创经皮钢板内固定术能有效减少手术时间、术中出血量、术后引流量、术后发热时间以及住院时间，降低并发症发生率，改善患者术后膝、踝关节功能，加快骨折愈合，促进患者康复，值得临床应用。

关键词：胫骨 PILON 骨折；微创经皮钢板内固定；切开复位钢板内固定术；疗效

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Comparative Study of Minimally Invasive Percutaneous Plate Osteosynthesis and Open Reduction Plate Osteosynthesis for the Treatment of Tibial PILON Fractures

DAI Xing-ming, YANG Xiao-ning, SUN Yi-gong, LIU Da-cheng, LI Guo-min

(Department of Orthopedics,The First People's Hospital of Xuzhou, Xuzhou, Jiangsu, 221002, China)

ABSTRACT Objective: To compare the clinical effect of minimally invasive percutaneous plate osteosynthesis and open reduction plate osteosynthesis for the treatment of tibial PILON fractures. **Methods:** 76 cases with tibial PILON fractures in our hospital from November 2014 to January 2016 were selected. According to therandom number table method, they were divided into observation group and control group as each group 38 cases, the observation group was treated with minimally invasive percutaneous plate osteosynthesis, the control group was treated with open reduction plate osteosynthesis. The operation time, intraoperative blood loss, postoperative drainage volume,postoperative fever time, fracture healing time, length of hospital stay, complication rate of two groups were contrasted. The hospital for special surgery knee score (HSS) and ankle joint function score (Baird) were compared between the two groups at the 4,8 and 12 months after operation. **Results:** The operation time, intraoperative blood loss, postoperative drainage volume, postoperative fever time,fracture healing time, length of hospital stay of observation group were significantly lower those of the control group (P<0.05); The HSS score and Baird score of the observation group at 4, 8 and 12 months after operation were significantly higher than those in the control group (P<0.05); The total complication rate of the observation group was significantly lower than that of the control group (P<0.05). **Conclusion:** Minimally invasive percutaneous plate osteosynthesis can effectively reduce the operation time, intraoperative blood loss, postoperative drainage volume, postoperative fever time, length of hospital stay comparison with open reduction plate osteosynthesis, reduce the probability of complications, to improve the function of knee and ankle joint and accelerate the healing of fracture, promote patient recovery, is worthy of clinical application.

Key words: Tibial PILON fractures; Minimally invasive percutaneous plate osteosynthesis; Open reduction plate osteosynthesis; Curative effect

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前言

胫骨是小腿双骨之一，位于双小腿内侧，是小腿骨中重要承重骨，对于支撑身体有着重要的作用[1,2]。胫骨 PILON 骨折又称之为胫骨远端爆裂性骨折，多指胫骨远端 1/3 处骨折，由高处纵向的压缩暴力或者下肢的扭转暴力导致骨折片向四周爆裂，通常患者高处坠落、车祸、被重物碾压或者走路时意外绊脚

作者简介：戴醒明（1973-），男，本科，主治医师，从事创伤骨科、显微外科及关节骨科方面的研究，E-mail: wradfg@163.com

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前摔都极易造成胫骨 PILON 骨折[3,4]。胫骨 PILON 骨折属于严重肢体损伤型骨折,且常常伴随严重的软组织损伤和皮肤破裂等症状且致残率较高,因此临床治疗颇为棘手[5,6]。切开复位钢板内固定术是目前临床上用于治疗 PILON 骨折的常见手术方法,其主要是通过切开患者骨折处的皮肤及组织,在暴露骨骼直视的情况下用钢板、金属螺钉、骨板或者钢丝直接连接固定骨折处的断骨,以保持骨折端复位,但该手术方法存在切口大、术中出血量大、易加深局部皮肤及软组织的损伤程度从而引发术后感染等弊端,因此研究临床疗效更佳的手术方法显得极其重要[7,8]。微创经皮钢板内固定术是近年来创伤型骨折治疗中被广泛应用的微创手术,具有切口小、术中出血量小及术后恢复愈合快等特点[9,10]。本研究为对比微创经皮钢板内固定术与切开复位钢板内固定术治疗胫骨 PILON 骨折患者的临床疗效,对两组患者采用不同的手术方法进行对照研究,现做如下报道。

1 资料与方法

1.1 一般资料

选取 2014 年 11 月 -2016 年 1 月在我院接受治疗的胫骨 PILON 骨折患者 76 例,纳入标准:(1) 经 CT 影像确诊为胫骨 PILON 骨折;(2)均为首次胫骨 PILON 骨折;(3)术前意识清晰;(4)患者均签署知情同意书。排除标准:(1)患有贫血、糖尿病史患者;(2)患有血管或神经损伤等疾病者;(3)患有下肢静脉血栓疾病者;(4)无法回访、不遵医嘱康复训练者。采用乱数表法将患者分为观察组和对照组各 38 例。观察组男 19 例,女 19 例,年龄 19-66 岁,平均年龄(42.66± 12.09)岁,其中高处坠落 10 例,车祸 17 例,重物碾压 7 例,意外绊脚摔伤 4 例,Ru-di-Allgower 分型:Ⅰ型 17 例,Ⅱ型 11 例,Ⅲ型 10 例。对照组男 21 例,女 17 例,年龄 18-65 岁,平均年龄(42.51± 12.53)岁,其中高处坠落 11 例,车祸 16 例,重物碾压 6 例,意外绊脚摔伤 5 例,Ru-di-Allgower 分型:Ⅰ型 16 例,Ⅱ型 12 例,Ⅲ型 10 例。两组患者的一般资料无明显差异(P＞0.05),存在可比性。

1.2 术前准备

(1)术前明确了解两组患者致伤原因、骨折部位、骨损伤程度,初步判断患者伤情;(2)了解两组患者既往病史及药物过敏史等基本情况;(3)对两组患者进行身体状况的评估,测量体温、心率、呼吸和血压等生命体征;(4)根据两组患者的骨折及软组织损伤程度制定对应的麻醉方案;(5) 对两组患者进行术前准备、术中风险及术后注意事项的宣讲,解除患者紧张焦虑情绪,并签署手术知情同意书。

1.3 手术方法

两组患者均在术前半小时行硬膜外麻醉,手术区域进行反复清洗消毒,在患侧肢体捆绑气压止血带。观察组行微创经皮钢板内固定术治疗,根据患者骨折程度及软组织损伤程度选择内固定所需的钢板类型及钢板长度,在患侧内踝处切一长度约 3-5 cm 纵向的小口,在不暴露关键面的情况下根据胫骨远端的结构修复受损关节面及关节间隙,患者均采用间接复位的手法,切开深筋膜并使用骨膜剥离子在皮下建立深筋膜与骨膜分离式隧道,在合理位置置入锁定钢板,通过 X 射线来确认复位是否满意,并使用相同规格的另一块钢板在皮肤外侧准确定位钉孔位置,切一小口各置入 3-5 枚螺钉进行固定。对照组行切开复位钢板内固定治疗,除手术方式为切开复位,其他均与观察组一致。

1.4 观察指标

对比两组患者手术中失血量、手术时间、术后引流量、术后发热时间、骨折愈合时间及住院时间等手术指标;采用膝关节功能评分标准(HSS)[11]、踝关节功能评分标准(Baird)[11]对患者术后 4、8、12 个月的膝关节功能和踝关节功能进行评价。HSS 评分主要针对疼痛、功能、活动度、肌力、屈曲畸形、稳定性、减分项目等七个方面进行评测,满分为 100 分,优:大于 85 分,良:70～84 分,中:60～69 分,差:小于 59 分。Baird 评分主要针对疼痛、踝关节稳定性、行走能力、跑步能力、工作能力、踝关节活动范围、放射学结果等七个方面进行评分,满分为 100 分,优:96~100 分,良:91~95 分,中 81~90 分,差:0~80 分。记录两组患者术中休克、术后切口裂开、术后感染、关节僵硬、骨不连等并发症发生率。

1.5 统计学方法

选用 SPSS19.0 对所有数据进行统计分析,骨折类型、并发症情况等计数资料以率(%)的形式表示,进行 检验,Baird 评分、HSS 评分等计量资料以均值± 标准差($\bar{x}\pm s$)的形式表示,进行 t 检验,以 α=0.05 为检验标准。

2 结果

2.1 两组围手术期相关指标对比

观察组的手术时间、术后引流量、术后发热时间、术中出血量、骨折愈合时间、住院时间均显著低于对照组(P<0.05),见表 1。

表 1 两组围手术期相关指标的比较

Table 1 Comparison of the perioperative indexes in the two groups

Group	n	Operation time (min)	Intraoperative blood loss(mL)	Postoperative drainage volume(mL)	Postoperative fever time(d)	Length of hospital stay(d)	Fracture healing time(week)
Observation group	38	75.19 ± 35.66	110.23 ± 41.68	52.39 ± 22.54	3.21 ± 1.63	11.67 ± 5.08	13.58± 4.33
Control group	38	92.31± 37.57	271.35 ± 55.21	211.61± 78.98	7.19± 3.99	15.78 ± 7.97	19.62 ± 5.59
t		2.037	14.358	11.950	5.692	2.680	5.266
P		0.045	0.000	0.000	0.000	0.009	0.000

2.2 两组 HSS 评分、Baird 评分比较

两组患者术前 HSS 评分、Baird 评分对比差异不显著(P>0.05)。术后 4、8、12 个月两组 HSS 评分和 Baird 评分均高于术前,且观察组的 HSS 评分和 Baird 评分明显高于对照组(均

P<0.05），见表 2。

表 2 两组 HSS 评分、Baird 评分比较（$\bar{x}\pm s$，分）

Table 2 Comparison of HSS score and Baird score between the two groups($\bar{x}\pm s$, scores)

Groups	n	Time	HSS score	Baird score
Observation group	38	Before operation	63.95± 5.85	60.58± 5.31
		4 months after the operation	81.02± 8.03*#	83.11 ± 8.53*#
		8 months after the operation	84.68± 9.42*#	86.58± 8.89*#
		12 months after the operation	92.55± 10.41*#	92.26± 10.72*#
Control group	38	before operation	64.66± 6.53	61.02± 5.61
		4 months after the operation	72.57± 8.35*	72.06± 7.98*
		8 months after the operation	73.55± 8.01*	77.94± 8.86*
		12 months after the operation	82.33± 8.11*	84.79 ± 10.73*

Note: compared with preoperative, *P<0.05; compared with the control group, #P<0.05.

2.3 两组患者术中、术后并发症情况对比

观察组总并发症发生率显著低于对照组（P<0.05），见表 3。

表 3 两组者术中、术后并发症对比[n(%)]

Table 3 Comparison of intraoperative and postoperative complications between the two groups[n(%)]

Group	n	Intraoperative shock	Incision dehiscence	Postoperative infection	Ankylosis	Nonunion	Total complication rate
Observation group	38	0(0.0)	0(0.0)	1(2.6)	2(5.3)	1(2.6)	4(10.5)
Control group	38	1(2.6)	3(7.9)	2(5.3)	4(10.5)	2(2.6)	12(31.6)
x^2							5.067
P							0.024

3 讨论

胫骨 PILON 骨折致伤原因多为摔伤、砸伤、交通事故，根据 1969 年 Ru-di-Allgower 分类法将 PILON 骨折分为三种类型，Ⅰ型：关节面轻度受损，胫骨远端劈裂骨折，轻度移位；Ⅱ型：关节面明显受损移位，轻度粉碎型骨折；Ⅲ型：关节面严重受损移位，干骺断受损，严重粉碎型骨折[12,13]。临床特征多表现为骨折片向四周爆裂，因受到较大张力导致局部皮肤形成水泡甚至破裂，皮肤破裂后易形成开放型骨折，身体可伴随腓骨骨折，肢体短缩等[14,15]。因 PILON 骨折常伴随不同程度的软组织损伤，临床治疗难度大，术后关节恢复效果不佳，严重影响患者生活质量，所以研究更好治疗 PILON 骨折的手术方法迫在眉睫[16,17]。微创经皮钢板内固定术和切开复位钢板内固定术是临床上治疗 PILON 骨折的常用手术方法[18,19]。切开复位主要是切开患者骨折处的皮肤及组织，在暴露骨骼的情况下直视受损区域用钢板、金属螺钉、骨板或者钢丝等直接连接固定骨折处的断骨，以保持骨折端复位[20,21]。相对于传统切开复位术所带来的切口大、术中出血量大、骨折愈合时间长及术中术后并发症发生率高等弊端，微创经皮钢板内固定术则有了显著改良效果，手术原理主要是采用间接复位手法，通过纵向小切口，在不暴露受损关键面的情况下根据患者胫骨远端结果修复受损关节面及关节间隙，减少术中出血量，降低受损关节面软组织的损伤，加快术后愈合[22,23]。

本次研究结果显示，观察组围手术期相关指标均低于对照组，术后观察组 HSS、Baird 评分明显高于对照组（P<0.05），说明微创经皮钢板内固定术能有效降低术后感染，加快骨折愈合时间，有效改善膝关节功能和踝关节功能，从而促进术后恢复。对照组采用切开复位钢板内固定术，其手术原理是切开患者骨折处的皮肤及组织，暴露切口在直视受损区域的情况下通过解剖复位的方式以达到局部解剖组织的恢复，由于胫骨远端 1/3 具有复杂的解剖学特点，且 PILON 骨折常伴随软组织损伤，导致手术难度较大，手术切口大、暴露范围较广、术中出血量大、骨折端血供严重破坏，患者术后骨愈合时间长，康复效果不佳[24-26]。而观察组采用微创经皮钢板内固定术，其优点是切口小而美观，患者接受度较高，通过间接复位技术进行骨折复位，有效避免暴露骨折端，尽可能保护受损关节周围的软组织及周围血供，为骨折愈合及软组织修复提供良好条件，促进术后恢复[27,28]。在本次研究结果还显示，观察组总并发症率显著低于对照组，由于微创经皮钢板内固定术切口小，能有效减少术中出血量，避免术中因失血过多导致术中休克、术后伤口裂开和术后感染，术中减少对受损关节面及软组织损害程度，保护周围供血可有效促进骨折愈合速度，从而降低患者术后关节僵硬和骨不连并发症的发生概率[29,30]。说明微创经皮钢板内固定术对骨折部位损伤小，可以有效降低术后并发症并加快术后康复。

综上所述,在临床治疗 PILON 骨折中,相比切开复位内固定术,微创经皮钢板内固定术具有切口小,术中出血量少等优点,不仅能改善膝关节和踝关节功能,还能有效降低术后感染及并发症,加快术后愈合时间,促进患者康复,值得临床推广。

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