

Analysis on curative effect of percutaneous minimally invasive spinal internal fixation with pedicle screw rod system for thoracolumbar fracture.

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Abstract

Objective: Analyze the clinic treatment effect of thoracolumbar fracture by using the percutaneous minimally invasive spinal internal fixation with pedicle screw rod system.

Method: Collect data from 62 thoracolumbar fracture patients treated in our hospital in March 2012-2013 as the research object and divide the patients into the observation group and contrast group randomly. Each group includes 31 patients. 4-screw internal fixation method is used for treatment in the contrast group. The internal fixation of the percutaneous mini-traumatic spinal pedicle screw rod is used for treatment in the observation group. The clinic effect of two groups are analyzed and compared.

Results: The movement start time and hospitalization time of the observation group is significantly less than that of the contrast group ($P<0.05$). The in-operation bleeding amount of the observation group is significantly less than that of the contrast group ($P<0.05$). The ASIA score of the observation group is significantly higher than that of the contrast group ($P<0.05$). 3 patients suffering from complications in the observation group, including one patient with loose screws, one patient with cut infection and one patient with venous thrombosis. The occurrence rate of the complication is 9.68%. 12 patients suffer from complication in the contrast group, including three patients with loose screws, four patients with cut injection, two patients with venous thrombosis and three patients with cracked screws. The occurrence rate of the complication is 38.71%. The complication occurrence rate of the observation is significantly less than it of the contrast group ($P<0.05$).

Conclusions: The clinical treatment of thoracolumbar fracture based on the internal fixation of percutaneous mini-traumatic spinal pedicle screw rod system is better, this method can effectively shorten operation time and hospitalization time, reduce the bleeding and reduce the occurrence rate of complication, so this method is worthy of application in the clinic treatment.

Keywords: Percutaneous minimally invasive spinal internal fixation with pedicle screw rod system, 4-screw internal fixation operation, Thoracolumbar fracture, Clinical treatment effect.

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Introduction

To further analyze clinical treatment effect of percutaneous minimally invasive spinal internal fixation with pedicle screw rod system in treatment of thoracolumbar fracture, this paper selects 62 thoracolumbar fracture patients treated in March 2012 to 2013 in our hospital for group experiment. Now it is reported as follows.

General Information and Method

General information

Select 62 thoracolumbar fracture patients (treated in March 2012 to 2013 in our hospital) randomly into the observation group and contrast group. Each group includes 31 patients. The observation group includes 21 male patients and 10 female

patients. The maximum age is 70 y, the minimum age is 19 y and average age is 46.39 ± 6.63 y. These patients are injured due to the following reasons. 17 patients are injured due to traffic accidents, 6 patients are injured due to heavy object, 4 patients are injured due to falling and 4 patients are injured due to dropping. The average time of these patients from injury to treatment at the hospital is 3.69 ± 1.12 h. The observation group includes 19 male patients and 12 female patients. The maximum age is 68 y, the minimum age is 18 y and average age is 47.27 ± 6.28 y. These patients are injured due to the following reasons. 15 patients are injured due to traffic accidents, 7 patients are injured due to heavy object, 5 patients are injured due to falling, and 4 patients are injured due to dropping. The average time of these patients from injury to treatment at the hospital is 3.54 ± 1.07 h. The basic information of patients from two groups is roughly same in age, gender,

injury reason and treatment time. The differences are not statistical ($P>0.05$).

Method

4-screw fixation treatment is used for the observation group. The screw is fixed inside the up and down normal spine close to the injured spine. Cut and open, stop bleeding by using electric coagulation, puncture, install the screws inside the corresponding vertebral pedicle, and fix them by using the general TTL method.

The percutaneous minimally invasive spinal internal fixation with pedicle screw rod system is used for patients from the observation groups. 6-screw internal fixation is used. The prepared methods are same as those of the contrast group. After operation, stop bleeding, sterilize and prevent against injection by using the antibiotic.

Effect criterion

The patients from two groups are compared in operation time, hospitalization time, bleeding amount in operation, movement start time and function recovery after operation.

The after-operation function recovery is scored by using the ASIA-revised classification standard. The total score is 10 marks. A higher score indicates better recovery.

Table 1. Operation time, hospitalization time, movement start time, bleeding amount in operation and ASIA score of two groups.

Group	Patient number	Operation time (min)	Hospitalization time (d)	Bleeding amount operation (ml)	Movement start time (d)	ASIA score
Contrast group	31	169.97 ± 65.27	22.97 ± 4.27	283.25 ± 84.15	11.34 ± 4.74	6.43 ± 2.26
Observation group	31	115.51 ± 41.16	14.51 ± 2.16	219.53 ± 46.11	5.26 ± 1.53	9.42 ± 0.36
X ²		4.17	10.34	4.09	7.06	7.52
P		P<0.05	P<0.05	P<0.05	P<0.05	P<0.05

Table 2. Comparison of general information on two groups.

Group	Patient number	Age (y)	Time from injury to treatment (h)
Contrast group	31	47.27 ± 6.28	3.54 ± 1.07
Observation group	31	46.39 ± 6.63	3.69 ± 1.12
X ²		0.58	0.58
P		P>0.05	P>0.05

Discussion

The thoracolumbar fracture is a frequent spine injury in the clinic treatment and is mainly caused by some severe wounds. Generally the spine stability of the patients severely degrades in the clinic treatment. The spinal nerve function of partial patients is injured differently, so it severely affects health and living quality of patients [1]. With development and improvement of the science and technology and medical

Statistical processing

The experimental data are inputted to SPSS17.0 software package for statistical processing. The mean ± standard deviation is used to describe the measurement data. $P<0.05$ indicates that the comparative differences are statistical.

Results

The research results indicate that the operation time, movement start time and hospitalization time of the patients from the observation group are significantly shorter than those of the contrast group ($P<0.05$).

The bleeding amount in operation of the observation group is significantly lower than that of the contrast group ($P<0.05$). ASIA score of the observation group is significantly higher than that of the contrast group ($P<0.05$, Table 1). 3 patients in the observation group suffer from complications, including one patient with loose screws, one patient with cut infection and one patient with phlebothrombosis. The occurrence rate of the complication is 9.68%.

12 patients in the contrast group suffer from complications, including three patients with loose screws, four patients with cut infection and two patients with phlebothrombosis. The occurrence rate of the complication is 38.71%, so the complication occurrence rate of the observation is significantly lower than that of the contrast group ($P<0.05$, Table 2).

technology level, more technologies can be used to treat thoracolumbar fracture. The percutaneous minimally invasive spinal internal fixation with pedicle screw rod system is a frequent treatment method.

The thoracolumbar fracture and luxation is a severe disease and is mainly caused by the severe injury such as traffic accident and violence. The mechanism of this disease is complicated. Generally, patients suffer from different nerve

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function impairment. Impairment frequently involves three spines. If this disease is not effectively treated in time, it may severely affect the treatment effect and curing of patients [2-4]. The clinic research indicates that the injured spine fixation and long-term stability are critical in treatment of the thoracolumbar fracture [5,6]. The thoracolumbar fracture is mainly treated by using 4-screw vertebral pedicle screw internal fixation operation in the early period. This method mainly fixes up and down spine, closes the injured spine and does not fix the injured spine, so the screw will easily become loose after operation, which will affect treatment effect. With continuous improvement of the thoracolumbar fracture treatment method in recent years, 6-screw treatment method is extensively applied [7,8].

The percutaneous minimally invasive spinal internal fixation with pedicle screw rod system is based on 6-screw method and one fixation force point is added for the injured spine based on the traditional injured spine fixation, so it reduces occurrence rate of loose screws. In addition, the three-point fixation on the bar connecting the screws can improve stability of the whole vertebral pedicle screw bar system [9,10]. This operation mode complies with the principle of the modern mini-traumatic technology, reduces the operation wound of the patients, shortens the operation time, reduces occurrence rate of the bleeding amount and complication, and drives early rehabilitation of patients [11,12].

This paper mainly studies and analyzes 62 patients suffering from thoracolumbar fractures treated by our hospital in March 2012-2013. The movement start time and hospitalization time of the observation group is significantly shorter than that of the contrast group ($P < 0.05$). The in-operation bleeding amount is significantly less than that of the contrast group ($P < 0.05$). The ASIA score of the observation group is significantly higher than that of the contrast group ($P < 0.05$). Three patients suffering from the complication in the observation group, including one patient with loose screw patient, one patient with cut infection, and one patient venous thrombosis, and the occurrence rate of the complication is 9.68%. 12 patients suffer from complication in the contrast group, including three patients with loose screw, four patients with cut injection, two patients with venous thrombosis and three patients with crackled screws. The occurrence rate of the complication is 38.71%. The complication occurrence rate of the observation group is significantly lower than that of the observation ($P < 0.05$). The research indicates that the percutaneous minimally invasive spinal internal fixation with pedicle screw rod system has better effect in treatment of thoracolumbar fracture, can effectively reduce the operation time and hospitalization time, reduce bleeding amount, and reduce the occurrence rate of the complication, so this method is worthy of application in clinic treatment [13-15].

References

1. Zhenglian F. Analysis on clinic treatment effect of posterior vertebral pedicle screw system internal fixation for

- thoracolumbar fracture. *Chin Health Industry* 2012; 30: 109.
2. Tang J, Huang K. Treatment of percutaneous minimally invasive spinal internal fixation with pedicle screw rod system for thoracolumbar fracture. *Modern J Integr Trad Chin Western Med* 2013; 28: 3111-3112.
3. Sun K, He Q, Liu Z, Chen Q. Treatment of minimally invasive small cut internal fixation with pedicle screw rod system for thoracolumbar fracture. *J Modern Sci Chin Oper* 2013; 04: 286-288.
4. Ming J, Zheng H, Zhao Q, Chen Q, Wang G. Treatment of sextant percutaneous minimally invasive spinal internal fixation with pedicle screw rod system for thoracolumbar fracture: visit evaluation. *Chin J Tissue Eng Res* 2013; 48: 8343-8348.
5. Mai Y, Wei W, Huang C, Hua S, Li X, Lu J. Observation to treatment effect of posterior minimally invasive spinal internal fixation with pedicle screw rod system for thoracolumbar fracture. *Guangxi Med* 2011; 08: 1026-1027.
6. Akao Y, Nakagawa Y, Naoe T. MicroRNAs 143 and 145 are possible common onco-microRNAs in human cancers. *Oncol Rep* 2006; 16: 845-850.
7. Sachdeva M, Zhu S, Wu F. p53 represses c-Myc through induction of the tumor suppressor miR-145. *Proc Natl Acad Sci USA* 2009; 106: 3207-3212.
8. Chen X, Gong J, Zeng H. MicroRNA145 targets BNIP3 and suppresses prostate cancer progression. *Cancer Res* 2010; 70: 2728-2738.
9. Fu X, Tan D, Hou Z. miR-338-3p is down-regulated by hepatitis B virus X and inhibits cell proliferation by targeting the 3'-UTR region of cyclin D1. *Int J Mol Sci* 2012; 13: 8514-8539.
10. Hong L, Han Y, Yang J. MicroRNAs in gastrointestinal cancer: prognostic significance and potential role in chemo resistance. *Expert Opin Biol Ther* 2014; 14: 1103-1111.
11. Joshi HP, Subramanian IV, Schnettler EK. Dynamin 2 along with microRNA-199a reciprocally regulates hypoxia-inducible factors and ovarian cancer metastasis. *Proc Natl Acad Sci USA* 2014; 111: 5331-5336.
12. Zhang Y, Zheng L, Huang J. MiR-124 Radio sensitizes human colorectal cancer cells by targeting PRRX1. *PLoS One* 2014; 9: e93917.
13. Ogata-Kawata H, Izumiya M, Kurioka D. Circulating exosomal microRNAs as biomarkers of colon cancer. *PLoS One* 2014; 9: e92921.
14. Zhang Y, Zheng D, Xiong Y. miR-202 suppresses cell proliferation in human hepatocellular carcinoma by down regulating LRP6 post-transcriptionally. *FEBS Lett* 2014; 588: 1913-1920.
15. Xie K, Liu J, Chen J. Methylation-associated silencing of microRNA-34b in hepatocellular carcinoma cancer. *Gene* 2014; 543: 101-107.

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