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Analysis of the clinical effect of artificial joint treatment technology applied in traumatic orthopedics

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Abstract

To study the clinical treatment effect of artificial hip joint treatment technique on traumatic orthopedic patients. Methods: Ninety-two patients with femoral neck fractures admitted to our hospital between January 2016 and February 2022 were selected, randomly grouped, Follow up for one year, and the various treatment effects of the two groups were compared. Results: All treatment effects of patients in the observation group were better than those of patients in the control group (P < 0.05). Conclusion: The clinical effect of artificial hip replacement in elderly patients with femoral neck fracture is excellent and worth promoting.

Keywords

Artificial hip joint treatment technique;Closed reduction of femoral neck fracture and internal fixation with hollow;Femoral neck fracture; Traumatic orthopedics; Treatment effect

1. Materials and Methods

1.1. General Information

Ninety-two patients with femoral neck fractures admitted to our hospital between January 2016 and February 2022 were selected and randomly grouped, and the general data are shown in Table 1.

Table 1 Comparison of general information between the two groups of patients ($\bar{x}$ ± s) [n (%)

Group	Number of cases	Age group (years)	Average age (years)	Male Patients	Female patients
Observation group	46	67-89	75.37±4.19	16	30
Control group	46	68-86	75.65±4.52	14	32
X^2 /t	-	0.136		0.175	
P	-	0.613		0.675	

1.2. Methods

After admission to the hospital, patients in both groups were required to undergo routine and adjuvant examinations in accordance with the conventional orthopedic trauma treatment, to accurately assess their conditions, and to confirm the treatment plan. After the indications for surgery are clarified, the patients will be treated by surgery. Prior to surgery, the patient should be placed under combined lumbar and rigid anesthesia or general anesthesia.

Control group: Closed reduction of femoral neck fracture and internal fixation with hollow,

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Observation group: artificial hip joint treatment technique: the patient's posterior lateral approach to the hip joint was performed, the external rotator muscle group was severed, and then the joint capsule was cut, after which the femoral head was removed; the stump of the femoral neck was properly trimmed to prepare for the treatment of artificial hip joint replacement; during the operation, the acetabulum had to be abraded, the femoral marrow and acetabular cartilage were removed, the acetabular prosthesis was fixed, 45° of abduction and 15° of anterior tilt were maintained, the The femur is reamed and a femoral stem prosthesis is placed. After the surgery, the patient is examined to ensure that there are no problems or dysfunctions, the wound is irrigated, a negative pressure drain is placed, and the incision is closed. After surgery, the patient's vital signs should be closely monitored, and to prevent infection and deep vein thrombosis, the patient should be given antibiotics and anticoagulants, and the postoperative drainage should be observed and removed between 24h and 48h after surgery. The postoperative rehabilitation effect was observed and patients were encouraged to do bedside activities and rehabilitation training as soon as possible.

Postoperative management measures: Considering the possible early risks after the artificial hip joint treatment technique, the medical and nursing staffs need to do the corresponding management work after the operation. First of all, before placing the position, it is necessary to keep the limb in abduction neutral position, then it is necessary to prevent the pressure injury brought by long time bed rest, and change the position timely and reasonably. Then patients with multiple underlying diseases, because of the invasive nature of the surgery itself, will have a much higher rate of infection and thus reconstruct the patient's joint function. During close monitoring of the patient's condition, routine blood tests should be done on the day after surgery, and then the patient's neutrophil and white blood cell levels should be confirmed to confirm the antibiotic treatment plan and adjust the type, dosage and timing of antibiotics. If the patient's condition is relatively stable, the patient should be told to do early exercise therapy and be instructed to do joint training, and encouraged to actively participate in it; adopt the principle of gradual progress, mainly doing ankle flexion and extension training in the first two days after surgery, and gradually increase the intensity of training on the third day after surgery according to the patient's recovery, or instruct the patient to do six-minute walking training.

1.3. Observation indicators

① Surgical indicators.

② postoperative hip Harris score.

(iii) Recovery time from weight-bearing of the affected limb and fracture healing time.

④ Postoperative hip-related indicators.

⑤ Complication rate.

1.4. Statistical treatment

SPSS 20.0 statistical software was used for analysis, mean + standard deviation ($\bar{x}$ ± s) for measurement data, t-value test, and rate (%) for count data, X2 test, and when $P < 0.05$, the difference between the two data groups was statistically significant.

2. Results

2.1. Comparison of treatment indicators

See Table 2.

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Table 2 Comparison of treatment indicators ($\bar{x}$ ± s)

Group	Number of cases	Surgery time (min)	Time to get out of bed(d)	Blood loss (ml)	Length of stay(d)
Observation group	46	71.87±10.65	1.48±0.72	340.46±16.98	18.5±7.65
Control group	46	45.56±12.41	87.86±18.16	60.86±12.85	10.65±8.98
t	-	11.636	426.7	21.528	4.412
P	-	0.000	0.000	0.001	0.000

2.2. Comparison of Harris score of hip joint

See Table 3.

Table 3 Comparison of hip Harris scores ($\bar{x}$ ±s) (points)

Group	Number of cases	2 weeks after surgery	1 month after surgery	3 months after surgery
Observation group	46	42.32±3.48	65.57±3.21	80.16±5.37
Control group	46	56.62±4.03	79.65±5.29	87.98±6.80
t	-	18.215	15.433	6.121
P	-	0.000	0.000	0.000

2.3. Comparison of weight-bearing recovery time and fracture healing time of the affected limb

See Table 4.

Table 4 Comparison of weight-bearing recovery time and fracture healing time of the affected limbs ($\bar{x}$ ± s) (months)

Group	Number of cases	Weight-bearing recovery time of the affected limb	Fracture healing time
Observation group	46	1.48±0.72	72.46±10.49
Control group	46	87.86±18.16	145.98±20.37
t	-	426.7	74.48
P	-	0.000	0.000

2.4. Comparison of functional scores, pain scores, deformity scores, and activity scores

See Table 5.

Table 5 Comparison of functional scores, pain scores, deformity scores, and activity scores ($\bar{x}$ ± s) (months)

Group	Number of cases	Function rating	Pain score	Deformity score	Event Scoring
Observation group	46	84.15±2.67	2.16±0.65	3.26±0.66	3.66±0.76

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Control group	46	72.09±6.65	3.28±0.72	3.51±0.29	4.03±0.58
t	-	11.414	7.831	2.352	2.625
P	-	0.000	0.000	0.021	0.010

2.5. Comparison of complication rates

See Table 6.

Table 6 Comparison of the incidence of complications (during hospitalization) [n (%)

Group	Number of cases	Urinary Infections	Lung infection	Wound infection	Pressure sores	Incidence
Observation group	46	0	0	0	1	1 (2.17)
Control group	46	1	1	1	1	4 (8.70)
X2	-	-	-	-	-	1.903
P	-	-	-	-	-	0.168

2.6. Comparison of complication rates(continued)(Follow up for one year)

See Table 7.

Table 7 Comparison of the incidence of complications (after discharge) [n (%)

Group	Number of cases	Nonunion of bone	Different degrees of walking difficulties	Limb shortening	Incidence
Observation group	46	0	4	1	4 (8.70)
Control group	46	3	25	21	25 (54.35)
P	-	-	-	-	0.000

3. Discussion

3.1. Artificial joint replacement technology

Artificial joint replacement technology refers to the use of metal, ceramic or polymer polyethylene materials, based on the morphology, structure and function of the patient's human joints, to create artificial joint prostheses, which are implanted into the body through surgical treatment techniques to improve the function of the patient's joints[6] . Currently, the effectiveness of knee and hip joint replacement technology has been widely recognized in trauma fractures[7] , and in the past ten years, according to clinical practice data[8] , the success rate of both knee and hip joint replacement is over 90%, and after the treatment of patients with artificial joint replacement technology, more than 80% of patients can use the prosthesis after normal implantation. To some extent, this is a clear verification of the feasibility and prospect of the application of artificial joint replacement technology.[8] In addition to replacing the diseased joint with an artificial joint and restoring the function of the diseased joint, studies have also found that[9] : the treatment technique can relieve the patient's pain level, especially the pain can be effectively controlled. With the gradual advancement of surgical techniques and the gradual updating of biomaterials, it is possible to perform small joint replacement.

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3.2. Artificial hip arthroplasty in traumatic orthopedics

With the application of artificial hip arthroplasty in clinical practice, this procedure has effectively compensated for the disadvantages of traditional surgery. The former can effectively control and eliminate the patient's pain, and also significantly extend the life of the artificial joint, and gradually restore the patient's joint mobility and muscle strength, and the community has seen the advantages of artificial hip arthroplasty[10] . At present, China's population is gradually aging, and the number of elderly patients in trauma orthopedics is increasing, with problems such as osteoporosis, associated underlying diseases and long rehabilitation time after fracture, which have an impact on the treatment work. The application of artificial joint replacement technology can give full play to the advantages of this technology and provide a reliable system for the treatment of joint lesions in elderly patients, which can effectively cope with the problems of aging[11] .

For such patients, because some of them may be accompanied by diabetes and hypertension, it is necessary to choose a reasonable cemented prosthesis for treatment before choosing the prosthetic material. The choice of surgical method should be confirmed according to the patient's age and actual condition[12] , and then combined with the previous clinical experience, the operation time of artificial hip arthroplasty is shorter, the function of the patient's body will not be seriously damaged during the operation, and the requirements for the patient's tolerance level are lower, which can be effectively applied to patients who are too old and have poor physical condition; conventional surgery has relatively higher requirements for the surgeon and the patient, the operation time is longer, the degree of intraoperative trauma and postoperative risks are relatively high. Conventional surgery is relatively more demanding for surgeons and patients, with longer operating time, higher intraoperative trauma and postoperative risk events, and is not suitable for elderly patients[13] .

3.3. Prospects for the application of artificial hip arthroplasty

From the perspective of surgical indications, artificial hip arthroplasty can be applied in the treatment of ischemic necrosis of the femoral head, osteoarthritis, hip dysplasia, rheumatoid arthritis and other related diseases. From the perspective of the development situation, the scope of application of this technology has been clearly expanded, and the application strategy of hip arthroplasty and the norms of perioperative management are becoming more and more perfect, which also gives the hip arthroplasty This has laid a solid foundation for the standardized application of hip arthroplasty.[14] From an academic point of view, there is a large amount of literature on the application of artificial hip arthroplasty in the clinical setting, and the directions of application and innovative attempts are becoming more and more frequent, pointing the way to the future development of hip arthroplasty[15] . For example, the application of digital technology in hip arthroplasty has shown significant results.

3.4. Summary

The results of this study showed that all treatment effects of patients in the observation group were better than those in the control group.

In conclusion, the treatment of traumatized orthopedic patients through artificial joint replacement technology is of high value in terms of application, effective pain control, improvement of joint function, and gradual acceleration in the rate of recovery of function and elimination of activity limits. However, during the actual treatment through surgery, attention to detail is needed, and then combined with perioperative care management, to ensure that patients receive clear treatment as well as interventions with higher safety and clear value, which is worth promoting.

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