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Comparative Analysis of Surgery Using Combined Iliac Lumbar and Posterior Closed Screws for Pelvic Stability Maintenance

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Background: Pelvic fractures are prevalent complex fractures in traumatic orthopedics that tend to lead to an unstable posterior pelvic ring. This study aimed to analyze and compare the clinical efficacy of combined iliolumbar screws and posterior closure screws in the treatment of pelvic instability.

Material/Methods: Thirteen (study group) and 22 (control group) patients were treated with combined iliac lumbar screws and posterior closed screws, respectively. Patient baseline information, time between injury and operation, intraoperative blood loss, incision length, operation time, hospitalization days, and preoperative and postoperative visual analogue scale (VAS) scores were collected.

Results: There were no statistically significant differences in age, sex, mechanism of injury, concomitant injuries, and fracture type. The preoperative VAS score of the study group was 2.46±1.27, while the control group's score was 1.86±0.83 (*P*=0.101). Postoperative VAS scores increased to 7.46±0.66 and 7.05±1.36, respectively (*P*=0.311). The operation time for the study group was 213.92 ± 92.53 minutes, longer than the control group's time of 169.09±76.00 minutes (*P*=0.015). Blood loss in the study group averaged 465.38±240.99 mL, which was greater than the control group's average of 197.27±251.57 mL (*P*=0.004). The length of the surgical incision in the study group measured 8.62±2.14 cm, compared with 1.52±0.45 cm in the control group (*P*<0.001).

Conclusions: Treatment of pelvic fractures with iliac lumbar combined screws is more complex than other methods. However, this approach offers improved pelvic ring stability, thus facilitating simpler fracture healing. Therefore, it is a viable option for the management of unstable pelvic fractures.

Keywords: **Pelvis • Treatment Outcome**

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Introduction

Pelvic fractures are prevalent complex fractures observed in the domain of traumatic orthopedics, constituting approximately 3-8% of all fracture cases and 25% of multi-injury cases [1]. These fractures frequently result from high-energy incidents and frequently cause concurrent harm to abdominal organs, blood vessels, and nerves. Moreover, they are linked to a multitude of complications and exhibit a substantial risk of mortality [2-5]. Tile observed that the integrity of the sacroiliac, sacrotuberous, and sacrospinous ligaments, in addition to the posterior weightbearing sacroiliac joint complex, was critical for the stability of the pelvic ring [6]. A pelvic fracture that compromises the integrity of muscle and ligament structures causes destabilization of the sacroiliac joint, which ultimately leads to the formation of an unstable posterior pelvic ring [7].

Pelvic fractures were initially documented by Duverney in 1751. In 1980, Tile introduced a classification scheme for pelvic injuries wherein they were divided into 3 distinct categories: those characterized by vertical instability (type C), those characterized by rotational instability (type B), and those that are stable (type A) [8]. Prominent academic organizations, including the Association for Internal Fixation Research (AO/ASIF), the Orthopaedic Trauma Association (OTA), and the International Society of Orthopaedic and Trauma Surgery (SICOT), have significantly advanced the Tile classification for pelvic fractures. They have constructed a more comprehensive standard by summarizing and expanding upon prior classifications. As of now, the refined classification comprises 3 main categories, 9 subtypes, and 26 subgroups [9]. When considering the management of pelvic fractures, open or closed techniques, including the implementation of locking compression plates, reconstruction plates, and the pedicle screw system, are accessible for the treatment of injuries affecting the posterior pelvic ring [10-13]. A commonly utilized minimally invasive fixation technique for this category of injury is percutaneous sacroiliac joint fixation utilizing sacroiliac screws [14,15]. At present, this technology is widely employed in the field of clinical practice owing to its manifold benefits. It is a safe and effective treatment method [14,16,17] due to its reduced trauma, decreased complications, shorter procedures, and shorter recovery periods. An alternative approach to fixation entails utilizing the lumbar iliac pedicle system to secure the sacroiliac joint. This surgical methodology is an adaptation of the Galveston technique. By affixing iliac screws to the ilium and pedicle screws to the L4 and L5 vertebral pedicles, stability is restored to the lumbosacroiliac joint, and the stability of the posterior pelvic ring is achieved [18]. According to biomechanical investigations, this form of fixation is exceptionally stable. As one of the most tough components of the spine, the pedicle resists shear and pull-out forces effectively, enabling 3-dimensional fixation [19]. Zhou et al also found that simplicity, low rates of complications, and stable fixation characterize this surgical procedure [20]. Open reduction and internal fixation with plates, in addition to screws, have been employed at our hospital since 2010 in the surgical treatment of pelvic fractures. However, percutaneous closed reduction and screw internal fixation technology for the sacroiliac joint have gained popularity as surgical fixation methods for the sacroiliac joint in recent years. Certain scholars contend that percutaneous closed reduction and screw internal fixation of the sacroiliac joint result in reduced tissue trauma and bleeding when compared with open reduction. This leads to a less pronounced stress response and expedites the healing process. In cases of an unstable pelvis, compared with other internal fixation methods, the technology of internal fixation with iliac lumbar combined screws demonstrates superior biomechanical properties and resistance to stress damage in screw reconstruction at the lumbosacral junction [21]. This method helps maintains pelvic stability [20], and facilitates simpler fracture healing, ultimately improving patients' postoperative quality of life. Studies of the treatment of pelvic fractures report that we commonly employ iliac lumbar combined screws, internal fixation, and posterior closed reduction screws for internal fixation. While iliac lumbar combined screws for internal fixation shows promising biomechanical properties, there is a lack of comparison with posterior closed reduction screws for internal fixation. We believe that the use of combined iliolumbar screws for internal fixation to treat unstable pelvic fractures is more surgically complex, but is beneficial to the stability of the pelvic ring, thereby promoting simpler fracture healing. Therefore, between 2020 and 2022, a study was conducted to compare the efficacy of these 2 surgical methods in patients with pelvic fractures. The purpose of this study is to evaluate the clinical efficacy of iliac lumbar combined screws for internal fixation and posterior closed reduction screws for internal fixation.

Material and Methods

Patients

This study was a retrospective study involving 35 patients. From January 2020 to December 2022, a cohort of 35 patients with pelvic fractures, which were categorized as type B or type C based on Tile classifications, were randomly selected from the Trauma Center of the First Affiliated Hospital of Nanchang University. In an effort to ensure the anonymity of the analysis, all personal identifiers were eliminated from the collected data. The present investigation complied with the principles outlined in the Declaration of Helsinki and was granted ethical committee approval from the hospital. Written consent from every patient was obtained.

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Criteria for Inclusion and Exclusion

Patients who satisfied the following requirements were enrolled in the research: (1) individuals with pelvic fractures categorized as B and C Tile types; (2) individuals with a clear documented history of trauma; (3) individuals who underwent pelvic imaging examinations both prior to and after the operation; and (4) individuals who maintained follow-up records and complete personal information for a minimum of 6 months. Patients with the following conditions were ineligible: (1) systemic or localized infection; (2) severe vascular or nerve damage; (3) pathological fracture; (4) cognitive impairment, including Alzheimer's disease. From the database, patient attributes including age, sex, mechanism of injury, and classification of fractures were extracted.

Surgical Method

All of the patients in our research were administered general anesthesia and endotracheal intubation and were placed in the prone position on a specialized operating table that was transparent to X-rays. A total of 13 patients were treated with iliac lumbar combined screws for pelvic fractures, whereas posterior closed screws were utilized in 22 patients for their pelvic fractures.

Internal Fixation via Iliac Lumbar Combined Screws (Study Group)

A midline incision was performed in the lumbosacral region, ensuring meticulous dissection of the subcutaneous tissue and skin layers. Following this, the lumbar vertebral musculature and sacral posterior musculature were separated, exposing the articular processes on both sides. Upon identifying the insertion sites for the pedicle screws at L4 and L5, 2 screws were subsequently inserted. Furthermore, an iliac bone nail was introduced via the posterior superior iliac spine, and a titanium rod was attached to it. The distal extremity was immobilized, and the fracture was expanded and reduced prior to the sacroiliac joint being secured. The reduction and fixation of the sacroiliac joint were deemed satisfactory, and the placement of the screws was substantiated by fluoroscopy. After performing a comprehensive iodophor and saline flush, a rubber drainage tube was introduced into the affected area. Following that, muscles, thoracolumbar fascia, and subcutaneous fat were sutured layer by layer, and the incision was closed as shown in **Figure 1**.

Internal Fixation via Percutaneous Posterior Closed Screws (Control Group)

Fluoroscopic pelvic positioning was executed utilizing a C-arm X-ray machine to acquire entrance and exit views, in addition to anterior and posterior pelvic views. After observing adequate reduction of the fracture, a 2.5-mm-diameter guide pin was hammered gradually into the junction of the posterior third and middle third of the line connecting the anterior superior iliac spine and the posterior superior iliac spine. The guide pin's tail should be oriented in an upward direction. A subsequent 10° and 20° backward tilt were applied to the C-arm. The ilium and sacroiliac joint were traversed gradually with the guide needle until it reached the S1 vertebral body. The position of the guide pin can be observed in anterior, posterior, inlet, and outlet views utilizing pelvic fluoroscopy. This facilitates the identification of the appropriate guide pin placement and the necessary screw length. After confirming the position, cannulated sacroiliac screws of suitable length were chosen and inserted along the guide pin into the sacroiliac joint. Afterward, the screws were tightened. An additional fluoroscopic examination was conducted to verify that the screws were positioned properly within the bone, were of suitable length, and were firmly fastened. The screw placement was verified for accuracy by the same physician, as shown in **Figure 2**.

Preoperative Treatment

Before proceeding with the operation, every patient underwent preoperative pelvic imaging examinations, was administered heparin anticoagulant therapy, and underwent fluid rehydration and anti-infective treatment 30 minutes before the surgery. Patients had observed a 12-hour fasting period for both food and water before the surgery.

Postoperative Treatment

On the second day following the procedure, pelvic X-ray examinations were performed on all patients. The drainage tube was extracted between 24 and 72 hours subsequent to the surgical procedure, contingent upon the state of the drainage fluid. The incision dressing was changed every 2-3 days. Antibiotics were prescribed in accordance with the incision size. In order to prevent deep vein thrombosis of the lower extremities, patients were mandated to take rivaroxaban orally for a duration of 2 weeks following surgery, unless contraindicated. Following surgery, patients were instructed to begin turning exercises in bed the day after, progress to weightbearing training with crutches after 3 months, and were permitted to walk fully weightbearing after 4-6 months.

Follow-Up and Outcome Evaluation

Utilizing the Visual Analogue Scale (VAS), the severity of postoperative pain was assessed 1 day, 1 week, and 1 month following the procedure. The evaluation of fracture reduction was conducted using the Matta score. A range of parameters was documented, including surgical incision length, blood loss,

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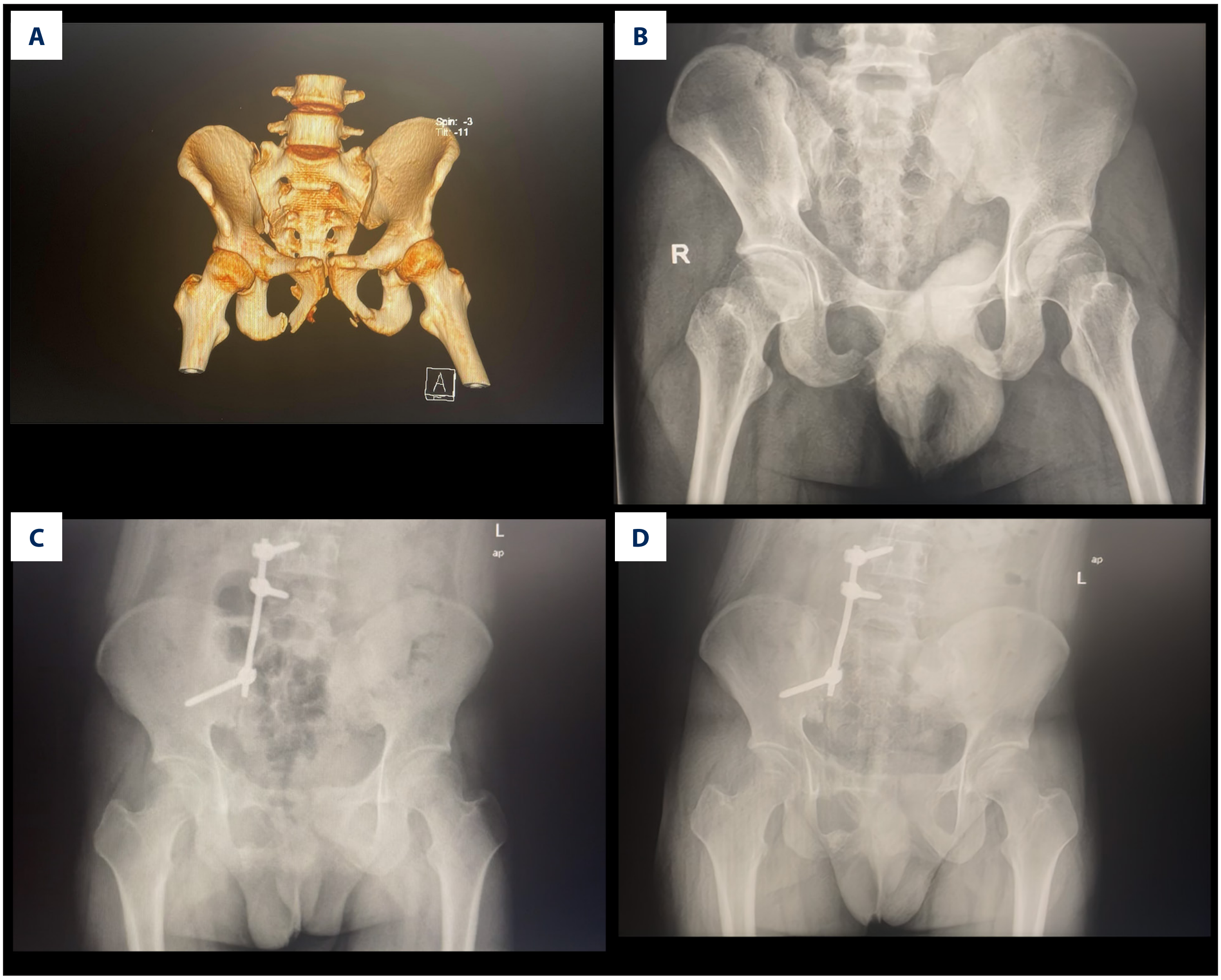

Figure 1. Posterior lumbar combined screw internal fixation for a male patient with Tile C-type pelvic fractures. (**A**) Preoperative 3-dimensional reconstruction of pelvis. (**B**) Preoperative pelvic anteroposterior X-ray. (**C**) Postoperative pelvic anteroposterior X-ray 3 month after surgery. (**D**) Postoperative pelvic anteroposterior X-ray 6 months after surgery. *Figure created by WPS picture (windows12.1.0.19302, Kingsoft Office).*

operation time, time from injury to operation, and hospitalization time. Follow-up evaluations were performed in the orthopedic department 1 week, 3 months, and 6 months subsequent to the procedure. Monitoring the progress of fracture healing and determining the weightbearing capacity of the affected limb were the objectives of these assessments. During each follow-up, physical examinations and pelvic X-rays were conducted, with particular emphasis on identifying any complications that may have occurred. The patients' functional recovery and activities of daily living were evaluated at the final follow-up, 3 months after the procedure, in accordance with the criteria established by Majeed et al and the Barthel index [22].

Statistical Analysis

Implementing SPSS 27.0.1 (IBM Corp., USA) [23], the measurement data were represented by mean ± standard deviation (x±s), and an independent sample *t* test was used for intergroup comparison. The quantitative data were expressed as cases, and the chi-square test was used for comparison between groups. *P*<0.05 indicates a statistical difference, *P*<0.01 indicates a significant statistical difference, and *P*<0.001 indicates an extremely significant statistical difference.

Results

General Information

The research study observed 35 patients who had undergone surgical treatment for Tile types B and C pelvic fracture. A minimum follow-up period of 6 months was established. Thirteen patients comprised the study group, while the remaining 22 comprised the control group. The demographics of patients are

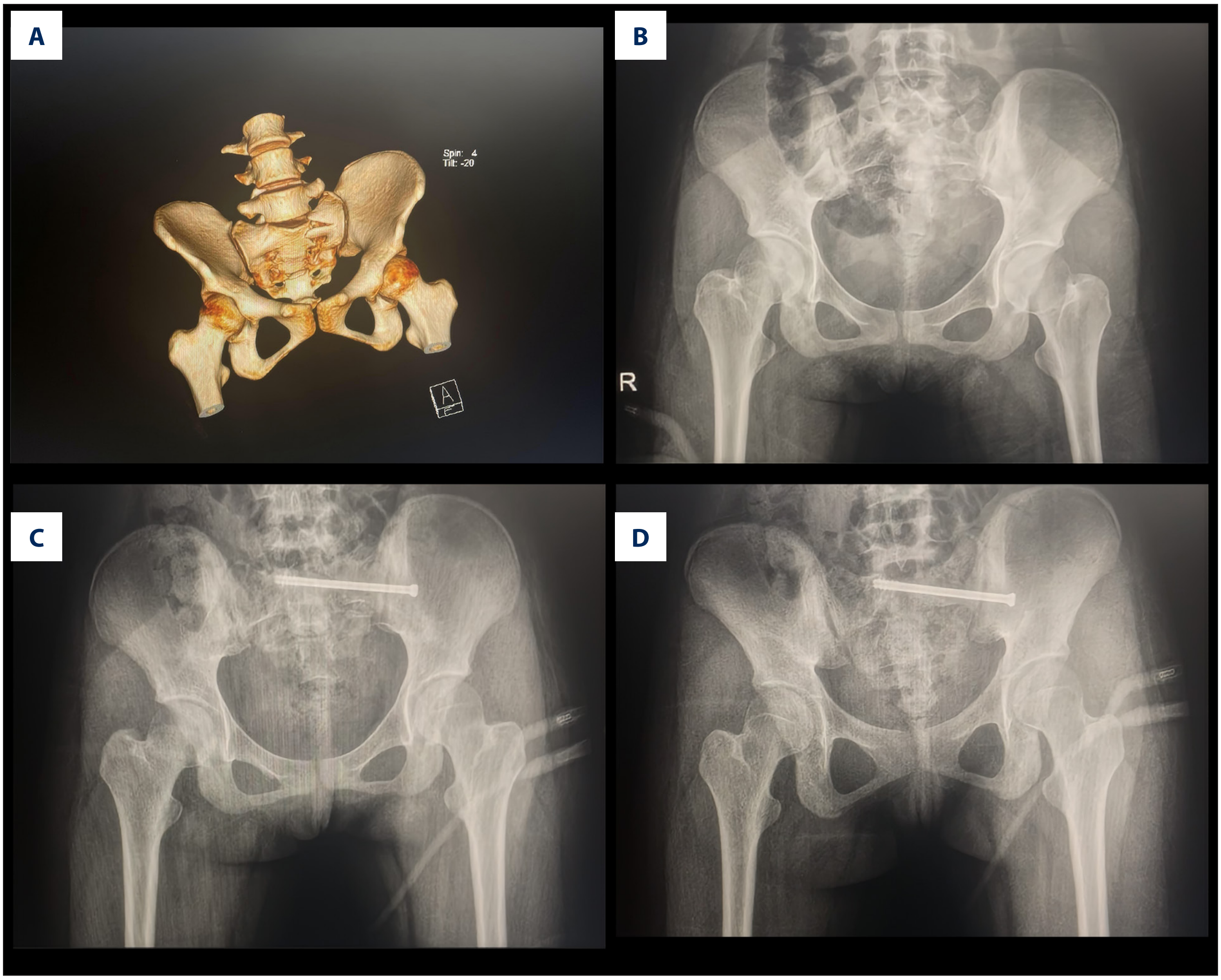

Figure 2. Percutaneous posterior closed screw internal fixation for a female patient with Tile B pelvic fractures. (**A**) Preoperative 3-dimensional reconstruction of pelvis. (**B**) Preoperative pelvic anteroposterior X-ray. (**C**) Postoperative pelvic anteroposterior X-ray. (**D**) Postoperative pelvic inlet X-ray. *Figure created by WPS picture (windows12.1.0.19302, Kingsoft Office).*

specified in **Table 1**. Within the 35 patients, the study group consisted of 10 male patients and 3 female patients, with an average age of 45.46±16.66 years (range: 18-68). The control group comprised 9 male patients and 13 female patients (*P*=0.078), with an average age of 44.55±17.38 years (range: 14-76) (*P*=0.879). Falls (7 cases), traffic accidents (4 cases), and crush injuries (4 cases) constituted the sources of injury in the study group. Falls (13 cases), traffic accidents (8 cases), and heavy objects (1 case) caused injuries in the control group (*P*=0.540). The study group exhibited pelvic fractures consisting of 8 Tile C-type fractures and 5 Tile B type fractures, while the control group exhibited 15 Tile B type fractures and 7 Tile C-type fractures (*P*=0.726). Patient characteristics did not differ significantly between the 2 groups (*P*>0.05). The accompanying injuries are detailed in **Table 2**. A total of 13 cases and 12 cases, respectively, of one or more accompanying injuries such as shock, rib fracture, lumbosacral plexus injury, lower limb fracture, upper limb fracture, kidney damage, lung contusion, intestinal rupture, and upper limb fracture occurred in the study and control groups. No statistically significant differences were observed between the 2 groups with regard to accompanying injuries (*P*>0.05).

Clinical Data

The clinical data and postoperative evaluation results are shown in **Table 3**. The average intraoperative blood loss for the study group was 465.38±240.99 mL (range: 150-1000), whereas for the control group it was 197.27±251.57 mL (range: 5-1000) (*P*=0.004**). The study group exhibited an average operation time of 213.92±92.53 minutes (range: 160-440), whereas the control group demonstrated an average of 169.09±76.00 minutes (range: 50-30) (*P*=0.015*). The mean surgical incision length for the study group was 8.62±2.14 cm (range: 7-15), whereas it was 1.52±0.45 cm (range: 1-2) for the control group (*P*<0.001***). Within the 2 groups, intraoperative blood loss,

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Table 1. Baseline data for the 2 groups.

Patient characteristic	Study group	Control group	*P*
Age, years	45.46±16.66 (18-68)	44.55±17.38 (14-76)	0.879
Male	10	9	0.086
Female	3	13	
Injury type			
Traffic accident	4	8	
Fall	7	13	0.540
Crush by heavy object	2	1	
Tile type			
Tile B	8	15	0.975
Tile C	5	7	

* *P*<0.05; ** *P*<0.01; *** *P*<0.001.

Table 2. Accompanying injuries of the patients.

Group	Case	1	2	3	4	5	6	7	8	9
A	13	2	3	3	2	4	2	4	3	3
B	12	1	7	6	5	8	2	6	1	2
P-value		0.253	0.6	0.418	0.784	0.199	0.593	0.599	0.11	0.268

* *P*<0.05; ** *P*<0.01; *** *P*<0.001. **A.** Study group; **B.** Control group; **1.** Lumbosacral plexus injury; **2.** Rib fracture; **3.** Brain injury; **4.** Lower limb fracture; **5.** Upper limb fracture; **6.** Kidney damage; **7.** Lung contusion; **8.** Intestinal rupture; **9.** Shock.

Table 3. Clinical data for the 2 groups.

Clinical data	Study group	Control group	*P*
Intraoperative blood loss (mL)	465.38±240.99	197.27±251.57	0.004**
Operative time (min)	213.92±92.53	169.09±76.00	0.015*
Time from injury to surgery (days)	11.00±5.96	8.23±3.52	0.091
Hospital stay (days)	26.85±19.35	19.86±10.64	0.176
Length (cm)	8.62±2.14	1.52±0.45	<0.001***
Time to weightbearing (weeks)	9.62±1.71	9.55±1.68	0.971
Fracture healing time (weeks)	10.31±1.60	10.27±1.60	0.668
Barthel index, 3 month	82.69±6.33	81.59±4.97	0.202
Barthel index, 6 month	93.08±5.22	93.18±4.23	0.066
Majeed score, 3 month	84.54±4.46	82.18±4.07	0.701
Majeed score, 6 month	95.62±0.87	95.91±1.10	0.454
Follow-up time (days)	251.77±120.16	238.30±66.87	0.682

* *P*<0.05; ** *P*<0.01; *** *P*<0.001.

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Table 4. VAS scores for the 2 groups.

Clinical data	Study group	Control group	*P*
Preoperative VAS score	2.46±1.27	1.86±0.83	0.101
VAS score 1 day after surgery	7.46±0.66	7.05±1.36	0.311
VAS score 1 week after surgery	1.69±0.75	1.68±0.72	0.967
VAS score 1 month after surgery	0.38±0.65	0.64±0.58	0.244

* *P*<0.05; ** *P*<0.01; *** *P*<0.001.

duration of the operation, and length of the surgical incision varied significantly. The average length of hospitalization for the study group was 26.85±19.35 days (range: 8-74), whereas the control group spent 19.86±10.64 days (range: 9-59) (*P*=0.176). In the study group, the average duration from patient injury to surgery was 11.03±5.96 days (range: 3-23), whereas in the control group, it was 8.23±3.52 days (range: 4-16) (*P*=0.091). In the study group, the postoperative weightbearing time was 9.62±1.71 weeks (range: 7-12), whereas in the control group, it was 9.55±1.68 weeks (range: 7-13) (*P*=0.971). In the control group, the mean preoperative VAS score was 1.86±0.83 (range: 0-3), whereas in the study group, it was 2.46±1.27 (range: 1-6) (*P*=0.101). The mean VAS score on the day following surgery was 7.46±0.66 (range: 6-8) in the study group, whereas in the control group it was 7.05±1.36 (range: 2-9) (*P*=0.311). The mean VAS score 1 week after the procedure was 1.69±0.75 (range: 1-3) in the study group, whereas in the control group it was 1.68±0.72 (range: 1-3) (*P*=0.967). The mean VAS score 1 month after the procedure was 0.38±0.65 (range: 0-2) in the study group, whereas in the control group it was 0.64±0.58 (range: 0-2) (*P*=0.244). As shown in **Table 4**, both groups experienced substantial pain reduction 1 week and 1 month following surgery.

At the final follow-up, all 35 patients, in both the study and control groups, had no postoperative complications; all patients had successfully healed their fractures.

In the study group, the mean fracture healing time was 10.31±1.60 weeks (range: 8-13), whereas in the control group, it was 10.27±1.60 weeks (range: 8-14) (*P*=0.668). The Barthel index for the study group was 82 (range: 70-90) 3 months after surgery, while for the control group it was 81 (range: 75-90) (*P*=0.202). Three months after surgery, the Majeed score for the study group was 84, compared with 82 (range: 77-91) for the control group (*P*=0.701). The Barthel index for both groups at the final follow-up was 93 (range: 85-100) (*P*=0.066), while the Majeed scores for the study group and control group were 95 (range: 95-97) and 95 (range: 95-98), respectively (*P*=0.454). The average follow-up period for the study group was 251.77±120.16 days (range: 180-539), whereas the control group exhibited a mean follow-up period of 238.30±66.87 days (range: 180-378) (*P*=0.682). No patients encountered complications such as wound dehiscence, infections, stiffness, pneumonia, neurovascular injury, or internal fixation issues during the follow-up period.

Discussion

The results of this research substantiate the effectiveness of percutaneous posterior closed screws and iliac lumbar combined screws in the treatment of pelvic fractures. Both surgical techniques promote early weightbearing, improve functional outcomes, reinstate the ability to engage in daily activities, and minimize the risk of complications, such as bedsores and pneumonia, that are commonly associated with extended periods of immobilization. The technique that was predominantly employed by the study group was the iliac lumbar combined screws fixation. Despite the extended duration of operations, heightened intraoperative blood loss, and more substantial surgical incisions in comparison with the control group, patients who underwent this technique demonstrated favorable fracture healing, swift functional recovery after surgery, and elevated follow-up functional scores, all without any significant complications. However, no substantial disparities were observed in terms of postoperative hospitalization duration or pain assessments in comparison to conventional surgical approaches. A variety of internal fixation techniques are frequently employed in conjunction with open reduction and internal fixation to treat pelvic fractures. A study was conducted by Zhang et al that examined 32 patients who had undergone anterior plate internal fixation for pelvic ring injuries. After the follow-up period, it was noted that all fractures had healed effectively and that the outcomes for the patients were satisfactory [24]. In a retrospective study, Ye et al examined 64 patients who had pelvic fractures. Of these, 31 patients underwent open reduction and internal fixation using the anterior approach, while 33 patients underwent the posterior approach. Following the procedure, all patients in both groups exhibited satisfactory or excellent fracture reduction, according to the post-follow-up evaluation [25]. Pelvic fractures are predominantly treated surgically through anterior or posterior open reduction techniques utilizing plates and screws to

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secure the fractures internally. Complete exposure, precise anatomical reduction, and immediate stabilization of the sacroiliac joints are all benefits of anterior surgery. However, extensive surgical incisions, a lengthy duration of the operation, substantial damage to soft tissue, and potential harm to the L5 and S1 nerve roots are all disadvantages [24,26,27]. On the other hand, the posterior approach offers several advantages, including the ability to expose the posterior iliac structure, minimize harm to blood vessels and nerves, provide sufficient space for plate insertion, and enable anatomical fracture reduction [28-31].

Significant technological advancements in minimally invasive procedures for closed reduction and percutaneous internal fixation of pelvic fractures have occurred in recent years [32-35]. Percutaneous sacroiliac screw fixation is a minimally invasive technique that has gained significant recognition and efficacy in the treatment of pelvic injuries. By means of central fixation that traverses the fracture site directly, this approach offers substantial resistance to vertical shear and torsion forces [36,37]. It provides advantages including diminished blood loss, a shorter duration of operation, minimal trauma, and expedited fracture healing. Liu et al performed a surgical investigation on the treatment of C-type pelvic fractures, wherein they affixed sacroiliac screws to patients afflicted with posterior pelvic ring fractures. The outcomes of both reduction and fixation were deemed satisfactory [38]. In a similar vein, Shuler et al reported on 20 cases of unstable patients with posterior pelvic ring injuries who underwent percutaneous iliosacral screw fixation without any loss of fixation or wound complications during the 9.6-month follow-up period. The results indicate that this surgical technique permits early fixation with minimal blood loss, the shortest operative time, and the least amount of morbidity associated with wounds [39]. The control group of the study also utilized this technique; in this group, a total of 22 patients who had pelvic fractures were successfully treated with reduction and fixation. Consequently, they experienced a positive course of healing and were able to return to their regular activities [40]. Accurate screw placement is necessary for successful percutaneous screw fixation [41]. Improper screw implantation can cause damage to the sacral nerve and blood vessels [42], which emphasizes the importance of the operator's surgical expertise and the use of appropriate auxiliary equipment.

Utilizing pedicle screws for L4 and L5 vertebral pedicle stabilization and 1-2 iliac screws for ilium restoration and lumbar sacroiliac joint stability, the research team performed posterior lumbar combined screw internal fixation. This method effectively ensures 3-dimensional fixation by resisting pull-out and shear forces [43,44]. An investigation by Pu et al involved 12 patients who had combined lumbar and iliac screw fixation after sacroiliac joint tumor resection. The authors chose L4 and L5 pedicle screws without extending the fixation upward to ensure internal fixation stability because this configuration more closely resembled the natural biomechanical state [44]. Sixteen patients who had their pelvic structures destroyed after primary sacroiliac joint tumor resection were retrospectively examined by Zhou et al. Translumbar iliac screw internal fixation was used to restore stability to the sacroiliac joint. This method demonstrated straightforwardness in execution, few complications, and dependable stability [45]. Thirteen patients were included in the present research investigation after undergoing iliac lumbar combined screw internal fixation; the procedure yielded favorable pelvic ring stability post-surgery, uncomplicated fracture healing, and no associated complications. In lumbar iliac screw fixation, the appropriate selection of the lumbar segment for screw insertion is critical to prevent unwarranted trauma, lengthy incisions, and suboptimal internal fixation outcomes.

There are also specific limitations to this study. Above anything else, it is critical to specify that this analysis is retrospective, which introduces selection bias by its very nature. Secondly, we used the VAS scale, the Majeed scoring system, and the Barthel index to evaluate the patients' preoperative and postoperative conditions and postoperative recovery, which introduced a certain degree of subjectivity into the study. Furthermore, the duration of follow-up in this study was comparatively brief. Moreover, the quantity of data presented in this article is restricted due to the fact that it is derived from a single center. In addition, the number of lumboiliac screw fixation procedures was limited, and no comparison between anterior and posterior approaches was made. Subsequent investigations ought to strive to augment the sample size and extend the duration of follow-up to facilitate more comprehensive comparisons. Hence, it is critical that future research undertakings prioritize the utilization of prospective randomized controlled designs and larger sample sizes.

Conclusions

Surgery using iliac lumbar combined screws treatment is more complex than other approaches. However, this approach offers improved pelvic ring stability, thus facilitating simpler fracture healing. Therefore, it is a viable option for the management of unstable pelvic fractures.

Declaration of Figures Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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