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Comparison of the Outcome of Tension band with Cannulated screw and Tension band with Kirschner wire on Patella fracture

[1]Dr Ahmar Saleem, [2]Dr Muhammad Akhtar, [3]Dr Hammood ur Rehman, [4]Dr Ibtesaam Haider, [5]Dr Muhammad Ibrahim, [6]Dr Aaqib Sarfaraz

[1]Postgraduate Resident, Orthopedic Unit, Services Hospital, Lahore
[2]Professor Orthopedic Surgery, Services Hospital, Lahore
[3]Postgraduate Resident, Orthopedic Unit, Services Hospital, Lahore
[4]Postgraduate Resident, Orthopedic Unit, Services Hospital, Lahore
[5]Postgraduate Resident, Orthopedic Unit, Services Hospital, Lahore
[6]Postgraduate Resident, Orthopedic Unit, Services Hospital, Lahore

Abstract

Background: Tension band wiring using Kirschner wires (TBW-KW) is the gold standard for patellar fractures, although complications are quite frequent. Cannulated screw fixation with tension banding (TBW-CS) has been suggested as an alternative.
Objective: To compare the clinical outcomes of cannulated screw tension band (TBW-CS) versus Kirschner wire tension band (TBW-KW) fixation among patients of patellar fractures.
Methods: This randomized controlled trial was conducted at the Department of Orthopedics, Services Hospital Lahore, over 6 months from Dec 15, 2024 till June 15, 2025. One hundred forty-eight (148) patients (18-80 years) with displaced or transverse patellar fractures (ASA-I/II) were randomized into TBW-CS (n = 74) or TBW-KW (n = 74) groups. Exclusion criteria were late presentation (>2 weeks), significant comorbidities or concomitant fractures. Outcomes measured were intraoperative blood loss, fracture healing time, and total efficiency of treatment. Data were analyzed with Mann-Whittney U and chi square tests, with the significance level $p <= 0.05$.
Results: Volume of blood loss was significantly less in the screw group (1.41 ± 1.19 ml vs. 1.78 ± 1.13 ml, $p < 0.001$). The healing time was shorter with screws (10.91± 1.30 vs 15.86 ± 1.55 weeks, $p < 0.001$). Overall efficiency was superior in the screw group (95.9% vs. 82.4%, $p = 0.008$). Subgroup analyses demonstrated that screw fixation was especially better in patients >50 years ($p = 0.021$), males ($p = 0.002$), transverse fractures ($p = 0.033$), ASA-II ($p = 0.014$), malnourished patients ($p = 0.022$), and early surgery <=72 hours ($p = 0.009$).
Conclusion: TBW-CS showed definite superiority in relation to TBW-KW with less blood loss, early healing, and greater treatment efficiency particularly in elders, malnourished, and ASA-II patients, also in transverse fractures, and in earlier interventions. Cannulated screw fixation is a preferred choice for most of the patellar fractures.
Keywords: Patellar fracture, Cannulated screw, Kirschner wire, Tension band wiring, Orthopedic fixation, Fracture healing.

INTRODUCTION

Patellar fractures are caused by extensor contraction against fixed lower limb or fall directly from a height on the apex of this superficial bone [1]. These fractures account for 1% among over all fractures [2,3]. Patella fractures are generally caused by low-energy trauma, with higher incidence among older adults (> 65 years) [4]. Fracture displacement, categorization, and patient characteristics all affect available management options [5]. For instance, surgery is the standard way of treating injuries disrupting the extensor mechanism, whereas non-operative treatment may be effective for injuries without extensor disruption and where little articular incongruity has occurred [1]. Therefore,

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anatomic reduction of the articular surfaces and adequate stability, which distributes sufficient loads of tensile forces generated by the extensor mechanism, are quite significant [1]. At present, open reduction and internal fixation using a Kirschner wire (K-wire) tension band (KTB; modified or not) is the most frequently used surgical procedure in managing patellar fractures [6,7]. However, a few improvements have been implemented since it was found to be associated with several complications [8]. However, major risk of postoperative complications (wire migration and breakage) leading to skin irritation, infection, discomfort and loss of reduction is reported in literature [6]. Furthermore, no long term improvement in knee joint function were observed [6,7]. Because of so many complications, different treatment methods were implied which were more effective than K-wire tension band fixation in treating patients with patella fractures [6]. Other approaches, including closed reduction and cannulated screw-assisted fracture fixation have been suggested to remediate these disadvantages of KTB [6,9]. In one study, the mean intraoperative blood loss (mL) was 155.38 +- 28.37 for the Tension band with a cannulated screw (TBWCS) group and 187.47 +- 23.27 for the Tension band with Kirschner wire (TBWKW) group, with p less than 0.001. It was estimated that TBWCS group fracture healing time was 10.7 + 1.7 weeks, TBWKW group fracture healing time was 13.2 + 3.1 weeks, and the p-value was <0.001. Thus, it was asserted that the overall stabilizing effect of TBWCS is 100%, while for TBWKW it is 92% [9]. The aim of the current study is to investigate the influence of tension bands using Kirschner wire and cannulated screws on patellar fracture. No local data were available, and data from other populations demonstrated better outcomes (in terms of intraoperative blood loss, healing time, and overall efficiency) for treating patients using tension bands and cannulated screws. If furthermore, positive results are found in the current trial using Tension Band with Cannulated Screw, then this method may be considered in future in order to achieve better results and this will be helpful in achieving complete rehabilitation of patients. Also, the cost of a hospital stay and the number of re-admissions will be reduced.

MATERIALS AND METHODS

Study design: Randomized controlled trial
Setting: The study was done at department of Orthopedics Unit-I Services Hospital Lahore.
Duration: The study was done in 6 months after approval of synopsis (Dec 15, 2024 till June 15, 2025)
Sampling technique: Non-probability consecutive sampling
Sample size: The sample size of 148 (74 cases are estimated in each group) are estimated using 80% power of test, 95% confidence interval and 5% margin of error, using total efficiency of TBWCS as 100% and of TBWKW as 92%[9].
Inclusion criteria:

- Patients aged 18-80 years old of either gender
- Patients with diagnosed patella fractur as per operational definition with following types
    - **Displaced** (step-off >2-3mm or fracture gap >1-4mm)
    - **Transverse** (when patella breaks into 2 pieces)
- Patients having ASA-I and II

Exclusion criteria:

- Patients with suppurative infection of joints (on clinical record)
- Fractures of more than 2 weeks,
- Severe acetabular destruction, or obvious degeneration;
- Patients combined with fractures of other parts;

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- Patients with cardiopulmonary dysfunction
- Patients having severe diabetes (HbA1c > 10)
- Patients having diagnosis of cognitive impairment

Data collection procedure

The study was started after getting approval from hospital ethical committee and after approval of CPSP. The patients were requested to give informed consent (attaches)before data collection, and all patients were enrolled after getting the informed consent. Their basic demographical and contact details were taken. Patella fracture was defined as a break in the knee cap diagnosed on digital X-rays.

They were randomly assigned to two groups using lottery methods into group-A or Group-B. Patients in the Group-A were treated with a tension band with a cannulated screw, while patients in the Group-B were treated with a tension band with Kirschner wire. All the patients were undergone general anesthesia under supine position. All the procedures were done by consultant having more than 5 years.

Treatment Protocol

For the Kirschner wire tension band technique, a midline longitudinal incision was made on the patella, and the full-thickness skin flap was raised to expose the fracture site. Thorough debridement was performed, and under the guidance of a C-arm X-ray machine, Kirschner wires were used to replace and fix the fracture fragments. Continuous traction was applied to maintain correction stability, using Kirschner wires with a diameter of 2 mm for fixation. The joint cavity was cleaned, and after fixation, an 8-figure tension band was applied outside the wire. Deep tissue was buckled and embedded, a drainage tube was retained, the wound was sutured, and a pressure dressing was applied postoperatively. For the tension band with cannulated screw technique, a similar midline longitudinal incision was made, and the fracture site was exposed after elevating the full-thickness flap. Debridement was carried out, and a sharp reduction clamp was used for temporary fixation of fragments. Once the patellar joint surface was confirmed flat, two Kirschner wires (1.6 mm) were longitudinally passed through the fractured patella in parallel at the anterior one-third. Guided by these wires, a 4.5 mm semi-threaded stainless steel cannulated compression screw was inserted. After embedding the screw into the patellar bone, the guide needle was withdrawn. A steel wire was then passed through the cannulated screw, tightened in an 8-figure configuration, and embedded into the deep tissue. Finally, the joint cavity was irrigated, a drainage tube was placed, the wound was sutured, and a pressure dressing was applied. Patients were followed up for 16 weeks and outcome were measured. The primary outcomes were intraoperative blood loss, fracture healing time, and total efficiency. Intraoperative blood loss was calculated by subtracting the weight of dry gauze from wet gauze, with 1 g considered equal to 1 ml. Fracture healing time was recorded in weeks, based on radiological evidence of complete bone healing within 12 weeks. Total efficiency was assessed 16 weeks postoperatively using criteria adapted from Liu et al. (2020)[9], and was categorized as markedly effective or effective. A markedly effective outcome indicated absence of pain (VAS=0), normal knee joint motion (flexion 135°, extension 0°, internal rotation 10°), satisfactory bone healing on X-ray, and no complications such as traumatic arthritis or bursitis. An effective outcome was defined as slightly limited knee movement with otherwise satisfactory bone healing confirmed on imaging. All data were entered and analyzed using SPSS version 26. Quantitative variables (age in years, intraoperative blood loss in ml, and healing time in weeks) were expressed as mean ± standard deviation (S.D.), while categorical variables (gender, ASA status, type of patella fracture [displaced or transverse],

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malnourishment, and total efficiency) were presented as frequencies and percentages. Since the data were not normally distributed, the Mann–Whitney U test was applied to compare quantitative outcomes between the two groups, and the chi-square test was used to compare categorical variables, including total efficiency. Data were stratified for age, gender, malnourishment, type of fracture, duration of fracture, and ASA status. Post-stratification analyses were performed using the Mann–Whitney U test and chi-square test as appropriate, with a p-value ≤ 0.05 considered statistically significant.

RESULTS

A total of 148 patients were included, equally divided into two groups: Cannulated Screw (n=74) and Kirschner Wire (n=74). The mean age of patients was comparable between groups, with 40.39 ± 1.82 years in the cannulated screw group and 40.95 ± 1.83 years in the Kirschner wire group. The median (IQR) age was 35.0 (35.0) years versus 36.0 (34.25) years, respectively. No statistically significant difference was observed (Mann–Whitney U test, p=0.806). Intraoperative blood loss was significantly lower in the cannulated screw group (1.41 ± 1.19 ml; median 1.43 [19.50]) compared to the Kirschner wire group (1.78 ± 1.13 ml; median 1.78 [19.25]). The median difference was highly significant (p<0.001). Subgroup analyses revealed that this pattern (median difference) persisted across age categories (≤50 years, >50 years), gender, fracture type (displaced/transverse), ASA status, nutritional status, and duration of fracture (<72 hours or >72 hours), all with highly significant differences (p<0.001). Healing time was markedly shorter in the cannulated screw group (10.91 ± 1.30 weeks; median 11.0 [2.0]) compared with the Kirschner wire group (15.86 ± 1.55 weeks; median 16.0 [3.0]), with a highly significant difference (p<0.001). The superiority of cannulated screw fixation in terms of reduced healing duration was consistently observed across subgroups stratified by age, gender, fracture type, ASA grade, nutritional status, and duration of fracture (all p<0.001). Overall treatment efficiency was significantly higher in the cannulated screw group compared with the Kirschner wire group. In the screw group, 71 of 74 patients (95.9%) achieved successful outcomes compared to 61 of 74 (82.4%) in the Kirschner wire group. The difference was statistically significant (χ^2=7.0, p=0.008). Among patients ≤50 years, efficiency was higher with cannulated screws (94.1% vs 84.0%), though the difference was not statistically significant (p=0.103). However, in patients >50 years, cannulated screws achieved 100% efficiency compared to 79.2% for Kirschner wires (p=0.021). In males, the efficiency of cannulated screws was significantly superior (98.1% vs 78.7%, p=0.002). In females, efficiency was slightly higher in the screw group (90.5% vs 88.9%), though the difference was not significant (p=0.085). In displaced fractures, screws showed a higher efficiency rate (92.5% vs 76.5%), with borderline significance (p=0.053). For transverse fractures, cannulated screws achieved 100% efficiency versus 87.5% in Kirschner wires (p=0.033). Among ASA-I patients, efficiency was higher with screws (94.6% vs 86.1%, p=0.218), but not significant. Among ASA-II patients, screws were markedly superior (97.3% vs 78.9%, p=0.014). Malnourished patients benefited significantly more from screw fixation (97.4% vs 81.1%, p=0.022). In non-malnourished patients, screws again had higher efficiency (94.4% vs 83.8%), but this was not significant (p=0.145). For fractures treated within 72 hours, screws were significantly superior (97.6% vs 78.9%, p=0.009). For those treated after 72 hours, the difference was not statistically significant (93.9% vs 86.1%, p=0.282).

Table-1: Mean comparison of age (years), Intraoperative blood loss (ml) and Healing time (week) with respect to study groups

		Cannulated Screw	Kirschner Wire	p-value

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		(n=74)	(n=74)	
Age (years)	Mean ±S.D	40.39±1.82	40.95±1.83	0.806
	Median (IQR)	35.0±35.0	36.0±34.25	
Intraoperative blood loss (ml)	Mean ±S.D	1.41±1.19	1.78±1.13	<0.001**
	Median (IQR)	1.43±19.50	1.78±19.25	
Healing time (week)	Mean ±S.D	10.91±1.30	15.86±1.55	<0.001**
	Median (IQR)	11.0±2.0	16.0±3.0	

**Highly Significant

Table-2: Mean comparison of age (years), gender, types, ASA Malnourishment and Duration of fracture in study groups with respect to Intraoperative blood loss (ml) and Healing time (week)

			Groups		p-value
			Cannulated Screw	Kirschner wire	
Intraoperative blood loss (ml)					
Age (years)	18-50 years (n=51)	Mean ±S.D	1.42±1.97	1.79±1.10	<0.001**
		Median (IQR)	1.43±23.0	1.78±18.75	
	>50 year (n=23)	Mean ±S.D	1.40±1.21	1.77±1.22	<0.001**
		Median (IQR)	1.44±23.0	1.72±17.0	
Gender	Male (n=53)	Mean ±S.D	1.42±1.24	1.77±1.12	<0.001**
		Median (IQR)	1.43±23.50	1.76±20.0	
	Female (n=21)	Mean ±S.D	1.40±1.09	1.80±1.15	<0.001**
		Median (IQR)	1.44±13.50	1.80±20.0	
Type of fracture	Displaced (n=40)	Mean ±S.D	1.42±1.21	1.79±1.15	<0.001**
		Median (IQR)	1.44±20.75	1.78±17.50	
	Transverse (n=34)	Mean ±S.D	1.40±1.90	1.77±1.13	<0.001**
		Median (IQR)	1.40±18.75	1.78±20.50	
ASA status	ASA-I (n=37)	Mean ±S.D	1.42±1.20	179±1.19	<0.001**
		Median (IQR)	1.44±23.0	1.78±23.25	
	ASA-II (n=37)	Mean ±S.D	1.40±1.20	1.77±1.09	<0.001**
		Median (IQR)	1.42±17.50	1.76±18.25	
Malnourishment	Yes (n=38)	Mean ±S.D	1.43±1.16	1.77±1.14	<0.001**
		Median (IQR)	1.44±19.50	1.76±20.0	
	No (n=36)	Mean ±S.D	1.39±1.22	1.79±18.50	<0.001**
		Median (IQR)	1.38±24.75	1.79±18.50	
Duration of fracture	Within 72 hours (n=41)	Mean ±S.D	1.42±1.26	1.78±1.25	<0.001**
		Median (IQR)	1.44±25.50	1.75±23.25	
	> 72 hours (n= 33)	Mean ±S.D	1.42±1.13	1.79±1.02	<0.001**
		Median (IQR)	1.43±16.50	1.79±15.75	
Healing time (week)					
Age (years)	18-50 years (n=51)	Mean ±S.D	10.94±1.36	15.84±	<0.001**
		Median (IQR)	11.0±2.0	1.48±	
	> 50 years (n=23)	Mean ±S.D	10.83±1.19	15.92±1.72	<0.001**
		Median (IQR)	11.0±2.0	16.0±4.0	
Gender	Male (n=53)	Mean ±S.D	10.87±1.29	15.98±1.54	<0.001**
		Median (IQR)	11.0±2.0	16.0±2.0	

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	Female (n=21)	Mean ±S.D	11.0±1.37	15.67±1.59	<0.001**
		Median (IQR)	11.0±2.0	16.0±3.0	
Type of fracture	Displaced (n=40)	Mean ±S.D	10.83±1.39	15.88±1.70	<0.001**
		Median (IQR)	10.50±2.0	16.0±4.0	
	Transverse (n=34)	Mean ±S.D	11.0±1.21	15.85±1.44	<0.001**
		Median (IQR)	11.0±2.0	16.0±2.75	
ASA status	ASA-I (n=37)	Mean ±S.D	10.92±1.42	15.61±1.52	<0.001**
		Median (IQR)	11.0±2.0	15.0±3.0	
	ASA-II (n=37)	Mean ±S.D	10.89±1.20	16.10±1.57	<0.001**
		Median (IQR)	11.0±2.0	16.0±3.0	
Mal nourishment	Yes (n=38)	Mean ±S.D	10.97±1.32	15.78±1.58	<0.001**
		Median (IQR)	11.0±2.0	15.0±3.0	
	No (n=36)	Mean ±S.D	10.83±1.30	15.94±1.54	<0.001**
		Median (IQR)	11.0±2.0	16.0±2.50	
Duration of fracture	Within 72 hours (n=41)	Mean ±S.D	10.75±1.34	15.89±1.46	<0.001**
		Median (IQR)	11.0±2.0	16.0±2.25	
	> 72 hours (n= 33)	Mean ±S.D	11.09±1.25	15.83±1.66	<0.001**
		Median (IQR)	11.0±2.0	16.0±3.75	

**Highly Significant

Table-3: Comparison of total efficiency with respect to study groups

Total efficiency	Cannulated Screw	Kirschner wire	p-value
Yes (n=132)	71(95.9%)	61(82.4%)	0.008*
No (n =16)	3(4.1%)	13(17.6%)	
Total	74(100%)	74(100%)	

*Highly significant

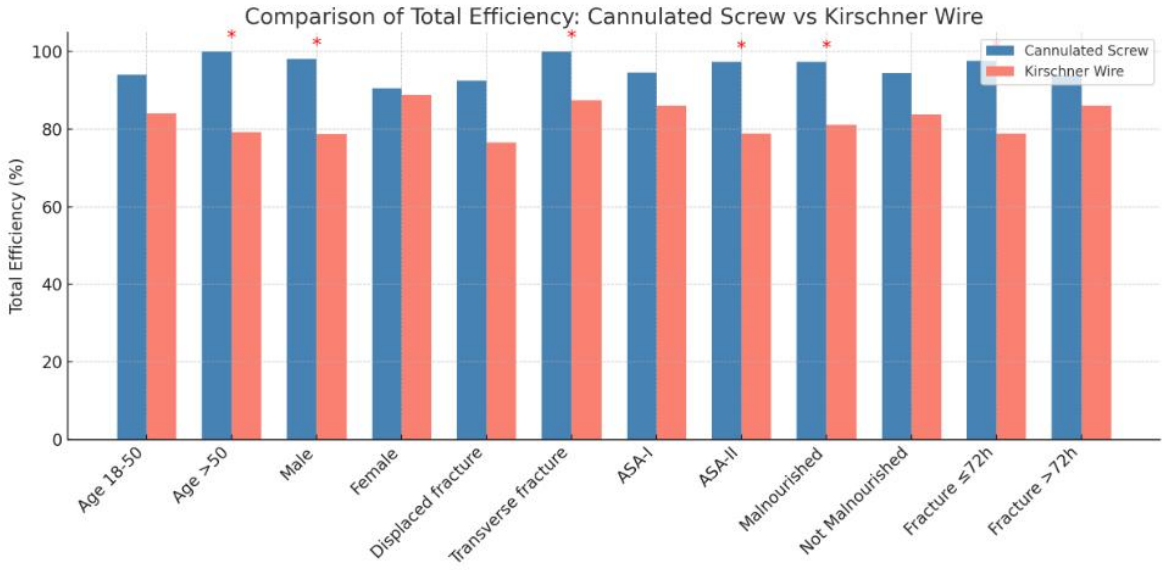

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Fig-1: Comparison of age (years), gender, types, ASA Malnourishment and Duration of fracture in study groups with respect to Intraoperative blood loss (ml) and Healing time (week)
* significant

DISCUSSION

Müller et al. first described a K-wire tension band (KTB) fixation in their article in 1979, which is now considered to be the main and standard operative approach for patellar transverse fractures [10]. The main benefit of this traditional technique is that it may help to hasten healing of fracture, by transforming tension at the fracture site, which occurs in tension band fixation, into compressive stresses at the articular surface [11]. Because of smooth shape, k-wires are more likely to loosen over time, which required reoperations for hardware removal over time [12]. But considering this fact, medical professionals came up with an improvement method by using cannulated screw instead of K-wire as it can be embedded in bone tissue, so the feeling of foreign body under the skin is less, and can be used to fix more severe comminuted fracture blocks with annular binding in the absence of lacunae [13]. In this study, the therapeutic outcome of using a tension band wiring using Kirschner wires (TBW-KW) and for using a tension band wiring using cannulated screws (TBW-CS) in the treatment of patellar fractures was compared. In our study, 148 patients in total, divided equally between the two groups. There was no significant difference of mean age between patients in the screw (40.39 ± 1.82 years) and wire (40.95 ± 1.83 years) groups (p = 0.806), which suggested that the baseline characteristics of both groups were well matched. In our series, blood loss during the operation was significantly less in the cannulated screw group compared with the Kirschner wire group (1.41 ± 1.19 ml vs. 1.78 ± 1.13 ml, $p < 0.001$). This was highly significant for all subgroups, split to age, gender, type of fracture, ASA status, nutritional status and fracture length (all p < 0.001). These findings are in line with Tijare et al., who saw soft tissue injury being reduced and perioperative morbidity decreased with the use of cannulated screws when compared to K-wires [14]. Liu et al also found that cannulated screw tension banding had better results in managing patella fractures with less blood loss than Kirschner wire tension banding (P < 0.05) [15]. In our study, healing period was significantly (p < 0.001) shorter in the screw group (10.91 ± 1.30 weeks; median 11.0) than that of the wire group (15.86 ± 1.55 weeks; median 16.0). Subgroup analyses confirmed this benefit in the younger patients (≤50 years: 10.94 ± 1.36 vs. 15.84 weeks; $p < 0.001$) and the older patients (>50 years: 10.83 ± 1.19 vs. 15.92 ± 1.72 weeks; $p < 0.001$). Similarly, faster recovery was found in the subgroup of females (11.0 ± 1.37 vs. 15.67 ± 1.59 weeks; $p < 0.001$) and sub-groups of males (10.87 ± 1.29 vs. 15.98 ± 1.54 weeks; $p < 0.001$) using screws. These data are consistent with Liu et al. who demonstrated that canulated screws when compared to K-wires resulted in better functional outcomes, faster fracture healing, less blood loss, shorter recovery time, and fewer complications. In addition, patients undergoing treatment with cannulated screws had a greater quality of life and functional measure scores, affirming cannulated screws as a superior surgical option [15]. A meta-analysis by Zhang et al also showed shorter union times and with better knee function scores with screw-based fixation [16]. In another trial, Liu, et al showed that CSTB was significantly more evidence of time to heal (p = 0.027), less likely complications (p = 0.007) and increased knee function scores (p = 0.011) when compared to K-wire tension band [17]. Overall, the efficiency of treatment was significantly better in the screw group (95.9%: 71/74) than in the wire group ($\chi^2 = 7.0$, $p = 0.008$). Subgroup analysis showed that the benefit of screw exhibited greater effects in some populations. In patients older than 50, wire efficiency was 79.2% while screw efficiency was 100% (p = 0.021). Despite no difference in the absolute rates of fixation (8.1% for wires and 7.9% for Screw), screw fixation was more successful

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in men (98.1%) compared to wire (78.7%) (p=0.002). Screws were also superior to wires in patients with ASA-II (97.3% versus 78.9% respectively, p=0.014), transverse fractures (100% versus 87.5% respectively, p=0.033), malnutrition (97.4% versus 81.1% respectively, p=0.022) and patients treated within 72 h (97.6% versus 78.9% respectively, p=0.009) These findings are similar to that of biomechanical investigation of Yadav et al in which screw fixation appeared to be statistically stable compared to K-wire built. Although mean radiological union among the groups was similar, cannulated screws provided superior functional results and knee range of motion compared with k-wire. With k-wire, there was a higher frequency of implant removal, soft tissue complaints, and prominence of the hardware [18]. Tijare and colleagues reported similar findings in randomized and systematic reviews to these, with higher functional scores and lower rates of annular subsidence around cannulated fixation. CSTBW had a lower VAS pain level ($p < 0.001$) and greater knee flexion ($p = 0.0048$) than TBW at three-month follow-up. In support of the advantages of cannulated screw based fixation, complications such as implant removal were more frequent in the TBW group than CSTBW groups [14]. Percutaneous CCS fixation was recently compared to TBW in a prospective trial of 30 patients. Compared with CCS, TBW was associated with increased incidence of infection (6.7%) and delayed nonunion (3.3%). Due to the increased knee flexibility and additional advantages that includes easier implant removal and lower soft tissue damage, CCS was a good replacement of TBW [19]. Prasad et al. reported that at six months CCS had better ROM (p=0.015), less VAS pain at all time periods, lesser hardware issues (p=0.008) and more Bostman score (p=0.032), which correlates well with our findings. Furthermore, CCS improved restoration to mostly pre-injury activities (p=0.021), decreased the amount of hardware removal (p=0.047), and offered equivalent function with less pain and greater safety [20]. Similarly, Shrestha et al. reported equivalent union times for all types of treatment modality, with CCS having better union, less complications, and discomfort [21]. Although cannulated screws are generally superior, some studies suggest that screw fixation may result in higher rates of failure in highly comminuted (C3) fractures, at the expense of decreased rates of symptomatic hardware removal. According to Zhu et al. Kirschner wires exhibited lower fixation failure in these complex fractures, whereas CCS exhibited lower implant irritation. These findings suggest that the type of fracture and details of the patient may be considered when choosing the harvesting method of fixation [22].In summary, our study found that tension band with cannulated screws is superior to tension band with Kirschner wires in terms of significantly reduced intraoperative blood loss ($p < 0.001$), shorter healing time ($p < 0.001$), and higher overall treatment efficiency ($p = 0.008$). These advantages were consistently observed across most patient subgroups, with particularly strong benefits in older patients, males, transverse fractures, ASA-II class, malnourished patients, and early interventions. Our findings corroborate a growing body of evidence that cannulated screw fixation provides more stable biomechanics, earlier recovery, and fewer complications, thereby supporting its preferential use in most patellar fracture scenarios. Finally, our finding was that tension bands installed with cannulated screws have advantages over Kirschner wires regarding reduced intraoperative blood loss ($p < 0.001$), shorter recovery period ($p < 0.001$) and higher total treatment efficiency ($p = 0.008$). Our data would support preferential utilization of cannulated screw fixation in most cases of patellar fracture by reinforcing an expanding body of evidence that it provides more stable biomechanics and earlier return to function with lower complication rate. Our study limitations were being single-centered and limited sample size for subgroup analyses. We looked at short term outcomes and did not measure long term function or complications. Results are also applicable primarily to displaced and transverse fractures; bias may also be introduced due to the lack of randomization.

CONCLUSION

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In the patellar fracture treatment, cannulated screw fixation was found to be superior to Kirschner wires because of decreased blood loss, more rapid healing and improved healing efficiency. The advantages were most apparent for older patients, transverse fractures, American Society of Anesthesiologists (ASA)-II, malnourished patients, and in timely interventions. These results reinforce cannulated screw fixation as a superior fixation method for the majority of patellar fractures, but choice of surgery must be considered on the basis of fracture type and patient factors.

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