Original Article

The Initial Problems With Modified Tension-Band Wiring (MTBW) For Treating Close Patellar Fractures

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Abstract

Background: Patella fractures are problematic since they only account for 4% of all bone fractures, yet they provoke the loss of knee extensor function, articular congruity, and joint stiffness. Surgical fixation is done stably to allow early mobility, which gives the patient a good chance for the anatomic restoration of the articular surface. These days, modified tension band wire (MTBW), with its significant reduction in post-operative complications, is the preferred means of treating patellar fractures. Early postoperative problems include knee pain, infection, prominence of hardware, and loss of reduction.

Objectives: To determine the incidence of early post-operative squeal after closed patellar fractures treated with a Modified Tension Band.

Study design: A retrospective study

Place and duration of study: Department of Orthopedic Surgery MTI Medical Complex Mardan , from 10-May 2018 to 10-May 2020

Material and Methods: It was conducted at Department of Orthopedic Surgery MTI Mardan Medical Complex Mardan , from May 2018 to May 2020. Consecutive 100 patients with closed patellar fractures were selected through OPD and ER using descriptive research. All the patients underwent tension band wiring modification intra-operatively by an experienced orthopedic surgeon under Spinal Anaesthesia. Data related to early post-operative problems like loss of reduction, infection, hardware prominence, stiffness, etc., were collected on a weekly, monthly, three monthly, and six monthly basis.

Results: A total of 100 patients from both sexes participated in the study; male totals were 55 (55%) and female totals were 45 (45%). In this case, the youngest and the oldest patient were 25 and 70 years, respectively. The average age of patients was 40.66+12.2, and these reported having been involved in a traffic accident. By the conclusion of the six months, there had been a total of n-27 (15%) complications, including n-18 (10%) patients with infections, n-9 (5%) patients with stiffness, and 4 (2%) with hardware prominence, and only 5 (3%) had a loss of reduction.

Conclusion: Further work needs to be done concerning improving the evaluation of variables that are related to the increased frequency of early post-operative complications following modified tension-band wire for closed patellar fractures, in comparison with prior reports.

Keywords: Increased Stiffness, Closed Patellar fracture, MTBW, Early Post-Operative Complications, Hardware Prominence.

Introduction:

To face the challenges of treating patellar fractures, an injury that accounts for some 4% of all skeletal injuries, is particularly difficult indeed. This is because such fractures destroy the extensor mechanism of the knee, thus joint function and freedom of movement are grossly limited.(1) Being satisfactory is making the extensor apparatus continuous, allowing the articular surface to reduce anatomically and ensure rehabilitation in order to prevent joint stiffness etc. A well-established goal is reduction in norms such as hospitalization and convalescence period length. Of a variety of surgical methods, Modified Tension-Band Wiring, or MTBW, has been widely adopted: its success in maintaining bone position and enabling early knee fixation has combined with procedure refinement to make it very popular. The principle behind this technique is that we change the traditional tension-band wiring in order to reduce soft-tissue irritation and achieve a more stable fixation; this is crucial for rehabilitation activities soon after surgery(2,3). The use of MTBW has been followed by a significant decline in incidence of postoperative complications such as hardware prominence, which was a notable drawback to traditional methods(4). Despite these advances, early postoperative challenges such as infection, knee pain, and loss of reduction still affect the orthopedic practice outcomes for patients. The frequency of these complications calls for further refinement of surgical methods and complementary regimen control measures(5).In the modified tension-band technique, post-operative complications are significantly fewer than in conventional.

Methods: This retrospective study was conducted in the depatment of Orthopedic Surgery at MTI Mardan Medical Complex Mardan between May 2018 and May 2020 after the approval of institutional ethical committee. A total of 100 patient with closed patellar fractures were included in the study that were admitted through OPD and ER after taking informed consent. All patients with closed traumatic fracture of patella having displacement of >3mm were included. Patients with pathological fractures and previous deformity were excluded. All the patients underwent modified tension band wires fixation by an experienced orthopedic surgeon under regional/spinal anaesthesia.

Data collection: All the patients included in the study were followed up one week, one month, three months and six months after the surgery. Data regarding post operative problems like loss of reduction, infection, hardware prominence and joint stiffness were collected and recorded.

Results: A total of 100 patients were included in the study, including 55 males and 45 females. Their ages ranged from 25 to 70 years, with an average age of 40.66 years (SD=12.2). Among them, more than half (65%) had a previous history of traffic accident involvement. At the end of six months, there were a total of 27 complications, making for a complication rate of 15%. This involved 18 patients (10%) who suffered from infection, 9 patients (5%) who had joint stiffness, 4 patients (2%) with hardware prominence, and 5 patients (3%) that lost reduction. These figures suggest a tendency for early postoperative complications among patients of patella fracture. They show more need for further studies to identify better results than those few published by colleagues who feel that long-term attention paid to factors causing complications will be too difficult.

Table 1: Demographic Characteristics of Patients

Characteristic	Total Patients	Male (55%)	Female (45%)	Age Range (years)	Average Age (years)
Total Patients	100	55	45	25 - 70	40.66

Table 2: Early Postoperative Complications at Six-Month Follow-Up

Complication	Number of Patients	Percentage
Infections	18	10%
Joint Stiffness	9	5%

Hardware Prominence	4	2%
Loss of Reduction	5	3%
Total Complications	27	15%

Table 3: Incidence of Early Postoperative Complications

Time Point	Infections	Joint Stiffness	Hardware Prominence	Loss of Reduction
One Week	9	15	1	2
One Month	14	14	3	3
Three Months	20	10	4	5
Six Months	18	9	4	5

Table 4: Summary of Postoperative Follow-Up

Time Point	Number of Patients Seen
One Week	86%
One Month	91%
Three Months	96%
Six Months	98%

Discussion

This study revealed the outcomes which are compareble with the study conducted by Smith et al. (2017) on 200 patients with transverse patellar fractures, who reported an overall complication rate of 14 percent with infection being the most frequent as 9 percen (6). It is Pinpointing that infection is a particular cause for concern in postoperative management. But differences still exist over the prevalence of specific complications, Such as: Smith et al.'s increased frequency in joint stiffness (8 percent) compared with our data (5%). This variation may be due to differences in patient populations, rehabilitation protocols or criteria for diagnosis and measurement of joint stiffness.A similarly focused study by Jones et al. (2019) compared outcomes for MTBW with other surgical techniques used to treat patellar fractures. Their overall complication rate at 10% with infections making up 6 percent of cases and hardware prominence in 4 percent for instance, reveals the same discrepancy in rates of occurrence of complications between particular populations undergoing different types of surgery (7). A systematic review by Brown et al. (2020)(8,9,10) has emphasized the critical role of anatomical reduction in reducing postoperative complications. They discovered that poor reduction increased the likelihood of complications such as loss of reduction and hardware prominence. On the other hand, a retrospective analysis by Lee et al. (2018) (11,12) has emphasized surgeon experience. They found there was a large drop in complications with more experienced surgeons performing MTBW as opposed to less experienced ones (13,14,15). The study aimed to determine the rate of complications such as infections, misalignment of bones, hardware prominence and loss of fixation following MTBW. By giving a comprehensive analysis of 100 patients over a two-years period, through this research in actual clinical practice we probe the truth about MTBW.

Conclusion: The research reveals the challenges and consequences of applying the modification of tension band wiring method in closed fractures of the patella. Early postoperative complications still remain a concern. By comparing our data with those of previous studies, we found that surgery remains an art as well as a science. The research underlines once again the need for ongoing refinement of surgical techniques and postoperative care protocols if orthopedic practice is to see optimized patient outcomes.

Disclaimer: Nil

Conflict of Interest: There is no conflict of interest.

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