ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 05 | May - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PERCUTANEOUS WIRE FIXATION OF PATELLA FRACTURES

Orthopaedics

Dr.Yogesh G Purohit MS Orthopaedics, Sheth VS General Hospital, Ellisbridge, Paldi, Ahmedabad, Gujarat, 380006

Dr. Rishav Deori Sheth VS General Hospital, Ellisbridge, Paldi, Ahmedabad, Gujarat, 380006

Dr. Samyak Gandhi Sheth VS General Hospital, Ellisbridge, Paldi, Ahmedabad, Gujarat, 380006

Mr. Aditya Purohit

ABSTRACT

This study aims to demonstrate a minimally invasive approach for the reduction and fixation of patellar fractures with intact or partially injured quadriceps tendons. This technique minimizes surgical dissection, reduces surgical time, and mitigates post-surgical rehabilitation challenges, leading to a quicker recovery compared to open surgery. The preservation of the quadriceps tendon offers a substantial degree of soft tissue stability, resulting in favorable functional outcomes. The procedure is simple and relatively non-traumatic, with excellent results regarding knee flexion range, quadriceps strength, and functional recovery reported in all cases.

KEYWORDS

Minimally invasive, rehabilitation, soft tissue stability, quadriceps rupture, patella fracture

INTRODUCTION

This study presents a minimally invasive method for the reduction and fixation of patellar fractures while preserving quadriceps tendon integrity. This approach aims to reduce surgical dissection and operative time, thus preventing difficulties in post-operative rehabilitation and recovery that are often associated with open surgical methods. When the quadriceps is intact, it contributes to better soft tissue stability and functional outcomes.

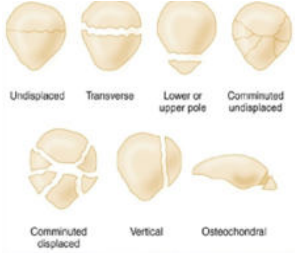
MATERIALS & METHOD

Twenty-one patients (13 males, 8 females) with patellar fractures were treated by closed reduction and percutaneous fixation. The mean age was 53 years (range 27 to 74 years). This technique is indicated primarily for undisplaced or minimally displaced fractures where the quadriceps extension is intact or partially injured. Among these, 12 cases involved partially displaced fractures with integrity of the quadriceps extension. Grossly displaced fractures with complete quadriceps ruptures requiring repair were excluded.

SURGICAL PROCEDURE

After anesthesia induction, the patient was positioned supine. Following careful preparation, the fracture was evaluated both clinically and via fluoroscopy. Hemarthrosis was aspirated with an 18-gauge needle for joint decompression. Under fluoroscopic guidance, attempts were made to reduce the fracture fragments using percutaneous clamps. A small incision was made at the superolateral corner of the patella, creating a subcutaneous plane with long curved artery forceps. A 16-gauge stainless steel aspiration needle was introduced through the lateral retinaculum into the inferolateral aspect of the patella. An 18-gauge stainless steel wire was then passed through this needle and pulled out through a small incision at the inferolateral corner.

Once the wire was in place, the needle was withdrawn. The wire was then encircled back to the superolateral corner to complete the encirclage fixation. After confirming the wire's position and reduction of the fracture fragments by fluoroscopy, the wire ends were tightened and twisted to align and compress the fragments effectively.



Another wire in a figure-of-eight configuration was passed anterior to the patella, similarly tightened to secure alignment. All cases utilized one encirclage wire (No. 18) and one figure-of-eight wire fixation. Importantly, no K-wires were used. Reduction and articular alignment were verified under fluoroscopy, and quadriceps repair was deemed unnecessary. The percutaneous fixation, adhering to tension-band principles, was adequate.

INDICATION

1) Undisplaced or crack fractures of the patella.
2) Minimally displaced fractures that can be easily reduced and fixed.
3) Partially displaced fractures with intact quadriceps tendons and expansion.
4) Comminuted fractures with in-situ fragments or easily conglomerated pieces.

RELATIVE CONTRAINDICATION

1) Comminuted, displaced intra-articular fractures that cannot be aligned or reduced under fluoroscopy.
2) Grossly displaced fractures requiring meticulous quadriceps repair.

ABSOLUTE CONTRAINDICATION

1) Compound fractures necessitating wound debridement and quadriceps repair.
2) Widely displaced patellar fractures accompanied by quadriceps rupture requiring open reduction and fixation.

ADVANTAGES

This technique avoids dissection through the quadriceps muscle, saving surgical time and eliminating the need for muscle repair.

Because the muscle remains undisturbed, rehabilitation is easier and faster compared to open fixation techniques.

Passing and tightening the wires assists in effective reduction and compression of the fracture fragments. Controlled passive range of motion exercises commenced on the first postoperative day, with full weight bearing allowed as tolerated.

The mean follow-up duration was 28 months (range, 24 to 35 months). Patients were evaluated using Lysholm II scores, clinical examinations, knee range of motion assessments, thigh circumference measurements, and radiographs.

RESULTS

All fractures healed without complications. The mean Lysholm score II was 84.8 (range, 75-96). Patients regained full knee range of motion within 6 to 7 weeks. A mean quadriceps atrophy of 0.8 cm was observed compared to the contralateral side. No implant failures or infections occurred.

CONCLUSIONS

Percutaneous closed reduction and fixation using stainless steel wire are effective for undisplaced, minimally displaced, and certain displaced transverse fractures of the patella without major separation. Longitudinal or oblique fractures with more than two major fragments can also be treated with this technique, provided the fragments are sufficiently large for fixation with wires. This minimally invasive method preserves the vascular supply of the patella, enables clear visualization during fluoroscopy, and facilitates early postoperative range of motion exercises. It is also applicable for highly comminuted fractures or transverse fractures with minor separation that do not involve rupture of the extensor mechanism.

DISCUSSION

This technique offers a viable minimally invasive approach for the reduction and fixation of undisplaced, minimally displaced, and comminuted patellar fractures while maintaining quadriceps integrity. It promotes early recovery, rehabilitation, and the regaining of range of motion, yielding better outcomes compared to traditional open approaches.