ORIGINAL ARTICLE

# Rate of pin tract infection in closed reduction and percutaneous Kirschner wire stabilization for fractures of the distal radius

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**Abstract**

**Introduction: Percutaneous K-wire stabilization is a well-documented modality for stabilization of distal radius fractures especially for extra-articular fractures in the elderly that are not amenable to plaster immobilitzation alone It goes without saying that like other modalities of treatment, percutaneous Kirschner-wire stabilization also carries the risk of some complications. These include pin tract infections potentially leading to osteomyelitis, nerve injury, pin migration and tendon rupture. As there is unclearity in literature in distal radius pin tract infection. The present study is undertaken to resolve this issue and if it will be found lower , than this modality will be continued in subsequent surgeries.**

**Method: It is a descriptive case series that was conducted between April 2013 to September 2013. Total of 66 patients were included in study with acute fracture less than 24 hours. Physical and radiological examination was done and were subsequently undergo closed reduction and percutaneous K-wire stabilization within 24 to 48 hours of admission. Patients were discharged the day following surgery and were followed in the outpatient clinics on 1, 2, 4 and 6 weeks as per standard protocol. Final outcome that is pin tract infection will be measured on 6th week .**

**Results: Out of 66 patient, 3 patients got infected. So, in our set up infection rate were 4.55 % which was low as compare to the aforementioned study.**

**Conclusion:It seems that Percutaneous pinning fixation is a safe and clinically effective protocol for treating distal radius fractures. Furthermore, we do not bury the K wires, which allows for their removal in clinic, thus preventing risks of further operative procedures.**

**Key Words: distal radius fracture, percutaneious K-wire stabilization, closed reduction, pin tract infection**

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**Introduction**:

Fractures of the distal radius are one of the most common injuries encountered in orthopaedic practice.[1] Most of these fractures are insufficiency fractures that occur s a result of trivial trauma in osteoporotic elderly patients, usually females.[2] The other end of the spectrum comprises of young individuals who usually suffer from this injury as a result of high energy trauma for example in sporting accidents.[3] A third group yet is the pediatric group in which these injuries are associated with growth plate (epiphysis) disturbances.[4]

Percutaneous K-wire stabilization is a well-documented modality for stabilization of distal radius fractures especially for extra-articular fractures in the elderly that are not amenable to plaster immobilitzation alone.[11] Namely the advantages are that the procedure is less invasive as compared to open reduction and internal

fixation and technically simpler to perform. It goes without saying that like other modalities of treatment, percutaneous Kirschner-wire stabilization also carries the risk of some complications. These include pin tract infections potentially leading to osteomyelitis, nerve injury, pin migration and tendon rupture. Out of the aforementioned, pin tract infection is one of the commonest.[8]

As there is unclearity in literature in distal radius pin tract infection. The present study is undertaken to resolve this issue and if it will be found lower, than this modality will be continued in subsequent surgeries.

**Methods**:

This is a descriptive case series conducted at department of Orthopaedic Surgery, Liaquat National Hospital, Karachi April 2013 to September 2013.

The values of rate of infection, as reported in previous studies[9] showed wide disparity 21% and 2%. Taken the average of these values that is 12.5% as a proportion of pin tract infection, margin of error 8%, confidence interval 95% sample size come out to be 66 patients.

Patients with no medical co-morbidities, of any gender, with age > 16 to 40 years at time of presentation with displaced extra-articular fracture of the distal radius presenting within 24 hours of the injury were included

Patients with co-morbidities including hypertension, diabetes mellitus, asthma, hepatitis, Mentally unstable patients. Previous ipsilateral fractures of the wrist. Intra-articular fractures, open fractures and undisplaced fractures. Fracture with dorsal angulation < 20°, Congenital malformations, Multiply injured patients, Patients requiring open reduction and bone grafting during surgery were excluded.

Data will be collected using a proforma incorporating the modified Oppenheim classification. Approval from institutional ethical review committee will be taken. Patients will be enrolled either from the outpatient clinics or the accident and emergency department. After formal written informed consent patients get admitted to the orthopaedic surgery service in the hospital and would subsequently undergo closed reduction and percutaneous K—wire stabilization within 24 to 48 hours of admission.

A single dose of I/V antibiotic (Cefuroxime 1.5 Gms) will be given at the time of induction prior to all procedure. All fractures will be stabilized using 2-3 non threaded K-wires of 1.6 mm diameter introduced through stab incision on the radial aspect of the radial styloid process. The free ends of these wires would be left protruding out of the skin. They would be cut and bent onto themselves to protect from accidental injury caused by sharp ends and to prevent pin migration. The wire insertion wounds would then be aseptically dressed. The construct would then be supplemented by the application of a well molded plaster cast using either plaster of paris or fiberglass.

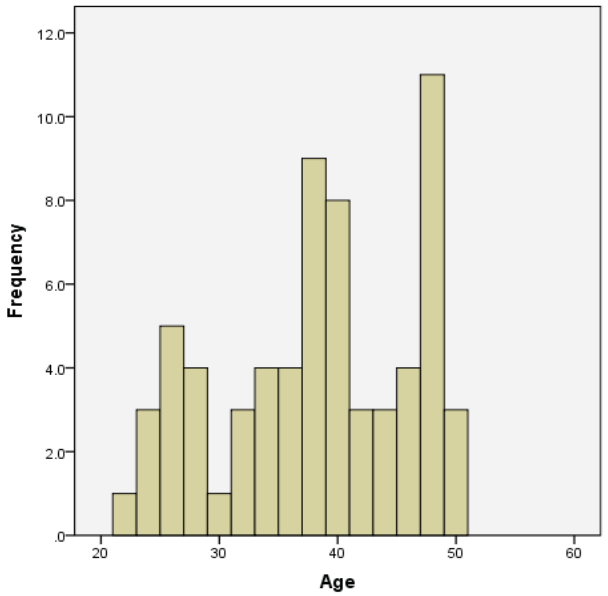
Patients would be discharged the day following surgery and would be followed in the outpatient clinics on 1, 2, 4 and 6 weeks as per standard protocol. Final outcome that is pin tract infection will be measured on 6th week.

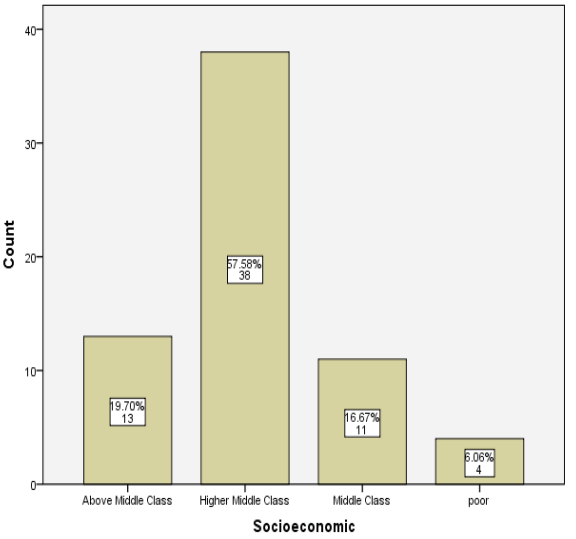
Data will be entered and analyzed in SPSS 17.0 statistical package. Continuous variables age will be analyzed as mean ± SD. Categorical variables i.e. sex, economic status, educational status, side of fracture and presence or absence of infection shall be analyzed as proportions and percentages. Stratification would be done for age, gender, economic and educational status to assess their effect on infection and post stratification Chi-Square test will be applied. A P-value of <0.05 will be taken as significant.

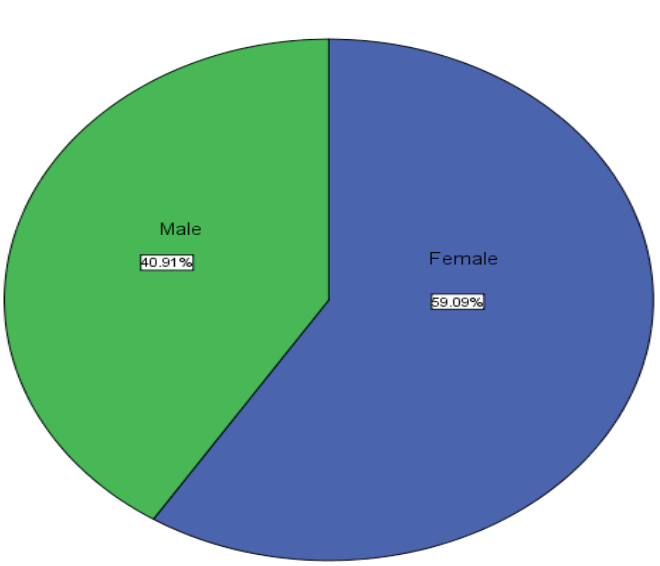
**Results**:

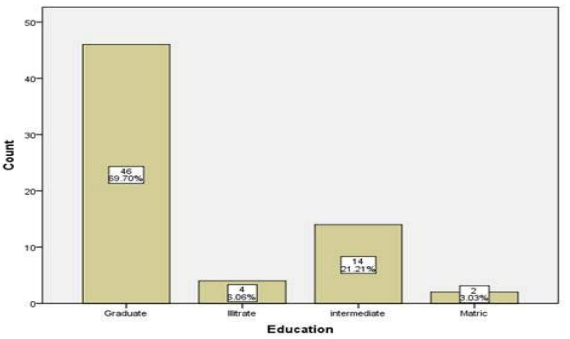
A total of 66 patients reported at Orthopedics department with acute fracture less than 24 hours. Age distribution of the patients is shown in figure. The average age of the patients was 37.97±8.033 years.

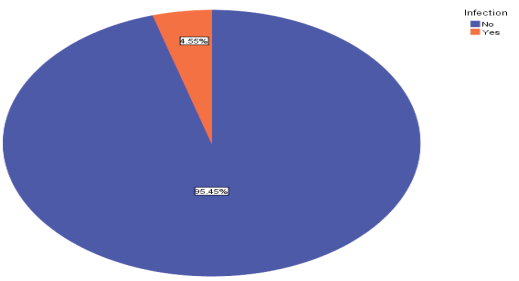
There were 27(40.91%) male and 39(59.09%) female. Regarding site 21 (31.8%) were left and 45 (68.1%) were right distal radius fracture. Socioecnomic point of view 38(57.58%) were higher middle class, 13(19.70%) were above middle class, 11(16.67%) were middle class and 4(5.06%) were poor. Literacy rate

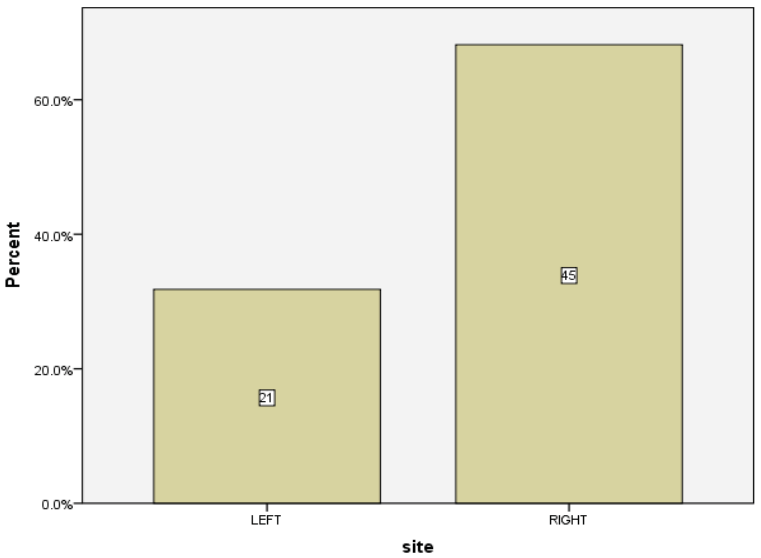



were 46 (69.70%) were graduate, 14 (21.21%) were intermediate, 2 (3.03%) were matric and 4 (6.06%) were illiterate.

Out of 66 patient, 3 patients got infected. So, in our set up infection rate were 4.55 % which was low as compare to the aforementioned study.

**Discussion:**

Distal radius fractures (DRF) occur more frequently than any other fracture. Whatever the age group, emergency management includes closed reduction and plaster immobilization. This treatment would suffice in children where the fracture spares the physeal plate, stable extra-

articular fractures in adults especially in those involving the non-dominant hand and those with low functional demands. For unstable fracture patterns, pediatric fractures involving the physeal plate and fractures involving the articular surface particularly in younger individuals where early mobilization is necessary to prevent joint stiffness and loss of motion, a multitude of treatment options have been described to provide optimal stability of the fracture during the healing process. These range from closed reduction and stabilization with percutaneous Kirschner wires, closed reduction and external fixation and open reduction and internal fixation using a variety of implants.[5]

In contemporary orthopaedic practice, there is a paradigm shift in the philosophy of treating distal radius fractures towards operative treatment. This is obviously done to avoid the inevitable complications associated with plaster immobilization in terms of joint stiffness, loss of function, higher incidence of malunion, nonunion and the dreaded complex regional pain syndrome.[3] Several treatment modalities including K-wire osteosynthesis,[20] external fixation, and open reduction and internal fixation with different implants are well established and used widely. External fixation,[21,22,23] eventually in combination with K-wires, may be associated with prolonged postoperative stiffness and pin tract infection and with loss of reduction. Dorsal plate osteosynthesis may cause tendon irritations[9], and therefore, hardware removal is often necessary,[10,24,25] whereas volar plates can be left in place in most cases[11]. Although several studies have shown good results for each method, the treatment of choice for unstable DRF remains controversial. With the exception of a very recent study, not even randomized control trials could convincingly show better results for any of the procedures[14,26,27].

Distal radius K-wire fixation is one of the except able option for extra articular fracture in elderly and pin tract infection is one of the most frequent problem[28,29].

Published literature has quoted infection rates after percutaneous K-wire stabilization as high as 21%[9]. This is fairly high for a procedure regarded as safe practice. Recent studies argue the pin tract infection and show rates of approximately 2%[10]

But this study show low rate of pin tract infection so we can continue this modality in subsequent surgeries.

Limitation of my study is small sample size and short duration of follow ups.

**Conclusion**:

It seems that Percutaneous pinning fixa-tion is a safe and clinically effective protocol for treating distal radius fractures. Furthermore, we do not bury the K wires, which allows for their removal in clinic, thus preventing risks of further operative procedures.

**Role and contribution of Authors**:

Dr. Syed Muhammad Khalid Karim, MBBS, FCPS, Liaquat National Hospital, Karachi, Senior Registrar, Orthopaedics, wrote the initial write up also helped in collecting the data.

Dr. M.Kazim Rahim Najjad, MBBS, FCPS, Liaquat National Hospital, Senior Registrar, Orthopedics, collected the data, references and helped in drafting the methodology, discussion, and results.

Dr. Zaki Idrees, FRCS, Liaquat National Hospital, Consultant Orthopedic Surgeon, conceive the idea and given the final touchup to discussion methodolgy, result and conclusion.

**Conflict of Interest**: None

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