

Prevalence Of Pin Tract Infection And Role Of Combined Saline And Povidone Iodine With Combined Spirit (Isopropyl Alcohol 70% V/V) And Povidone Iodine For Pin Tract Dressings.

Z Ali, L Khurshid, S Vakil, A Anjum, S Dhar

Citation

Z Ali, L Khurshid, S Vakil, A Anjum, S Dhar. *Prevalence Of Pin Tract Infection And Role Of Combined Saline And Povidone Iodine With Combined Spirit (Isopropyl Alcohol 70% V/V) And Povidone Iodine For Pin Tract Dressings..* The Internet Journal of Orthopedic Surgery. 2014 Volume 22 Number 1.

Abstract

Pin-site infection is a common complication in the treatment of open fractures treated with external fixators or percutaneously inserted pins or k- wires and has been reported to occur in up to 63% of pins^{1–4}. The insertion of pin violates the integrity of skin leaving a track for bacteria to invade. The tract gets sealed naturally by epithelialisation External fixations of fractures is a technique to stabilize fractures and limbs using pins passed through the skin to the bone held together by using external frame. Pin tract infections cause pin-bone interface to become loose hence compromising stability of frame⁷. Aro,Hein and Chao recommended regular tightening of clamp screws to prevent loosening of clamp pin interface. Pin care is the process of cleaning a pin and the skin around pin where the pin enters the body. Good care of the pin and the pin tract is very important to prevent infection. Prevention of pin tract infection is therefore is one of the important factors for success of external fixation technique⁵.

Pin tract infection can lead to ring sequestrum and persistent discharge. Prevention of pin tract infection therefore begins before pin is inserted. Planning begins from selection of pin for fixation and selection of frame geometry for fixator⁶.

Schanz screw selected must be appropriate for diameter of bone in which it is inserted. Pins larger than one third the diameter of bone leads to larger defect in the bone for colonization of bacteria and hence pin tract infections⁷.

There is very little evidence as to which pin site care regimen best reduces infection rates. There is a need for evidence-based practice guidelines for pin-site care as only few studies have compared the associated infection rates of different treatment methods.

Idea behind using above agents was due to majority of patients coming to government hospitals belong to lower socioeconomic group and free availability of spirit, saline and povidone iodine in government hospitals.

OBJECTIVE

Infection at the pin tract is a common complication of external fixation. This study was done to compare the rate of pin site infection following of combined saline and povidone iodine with combined spirit and povidone iodine.

A clinical study was conducted over a period of 18 -month period in post graduate department of orthopaedic skims medical college to look for prevalence of pin tract infections and its management.

PATIENTS

A total of 400 patients over a period of 18 months (July

2012 – December2013) were taken up for study out of which 250 patients were in study group and 150 patients in control group.

1850 pin sites were studied both in study and control group. The study group had 1200 pin sites while the control group had 650 pin sites.

METHOD

This was a prospective controlled study which compared the Prevalence of pin tract infection and role of combined saline and povidone iodine (control group) with combined spirit (isopropyl alcohol 70% v/v) and povidone iodine (study

group) for pin tract dressings. Proper pre operative planning was done prior to insertion of pin.

Care was taken at the time of pin insertion to reduce chances of pin tract infection. Pins were inserted with the help of hand drill only no power drill was used in both study as well as control group. High speed drilling was not used as this leads to thermal necrosis of bone and hence increased incidence of pin tract infections.

Insertion of pin begins with a small incision to prevent the catching of skin by drill bit and Schanz screw causing necrosis of skin. Too small an incision cause thermal necrosis of the edges of skin and too larger incision leaves an open wound for easy infection. Due care was taken to leave at least 2.5 to 3 cm margin between fracture site and the pin closest to the fracture site.

In ring fixators wires were properly tensioned to give a rigid frame.

The usual diameter of pin used for upper limbs external fixation was 4 mm and in lower limbs was 4.5 - 6 mm. For radius and ulna pin size was 3-3.5 mm

In both study and control group pin tract dressings were done daily by concerned doctor during hospital stay. Once the patients were discharged from hospital pin tract care was thoroughly taught to the patient and his attendants. Patients were told about need for pin tract care and pin tract dressing at least once a day. Pin tract care was continued till implant removal was not done. Patients were followed regularly on opd basis.

Due care was taken to avoid collection of blood or serum around pin track as blood and serum are ideal culture medium for bacteria.

Pin-tract infection was deemed to be present if increased pain, swelling erythema, cellulitis, black tissue around pin or purulent discharge at pin site however we did not distinguish between deep and superficial infection.

There is a distinction between the normal healing process and signs of infection. For example, pin-site reaction (which refers to the normal physiological changes at the pin and skin interface) is not a pin-site infection. Signs of pin-site reaction include changes in normal skin colour, increased warmth, and serous or slightly bloody discharge at the site; the condition should subside after 72 hours (Holmes et al, 2005).

We excluded patients with obvious sources of infection, pathologic fractures, and immunosuppression or an existing infection near pin sites.

The clinical management of pin-site wounds will depend on the severity of infection

RESULTS

A total of 400 patients were taken up for study out of which 250 patients were in study group and 150 patients in control group.

1850 pin sites were studied both in study and control group. The study group had 1200 pin sites while the control group had 650 pin sites. 400 patients, in whom 190 patients treated with uniplanar lower limb external fixators and 35 with Ilizarov ring fixator, 70 with distal radius external fixators, 105 patients treated with percutaneous k-wire fixation for elbow, hand and foot fractures, made up both groups. 154 pin sites (11%) got infected in study group while 157 (21%) pin sites got infected in control group.

CONCLUSION

There was a significantly lower prevalence of pin-tract infection amongst patients whose percutaneous pins were dressed with combination of spirit (70%v/v) and povidone iodine than those dressed with combination of saline and povidone iodine ($P = 0.02$).

Therefore it is better to do pin tract dressings with combination of povidone iodine and spirit.

Pin tract infections cause pin-bone interface to become loose hence compromising stability of frame hence pin tracts should be thoroughly taken care off.

Regular tightening of clamp screws to prevent loosening of clamp pin interface and hence prevention of pin tract infections

Patients need to be followed regularly to pick up any pin tract infections and treat them early.

Prevention of pin tract infection should begin before pin is inserted. Planning begins from selection of pin for fixation and selection of frame geometry for fixator.

Per cutaneous pins/screws selected must be appropriate for diameter of bone in which it is inserted. Pins larger than one third the diameter of bone leads to larger defect in the bone for colonization of bacteria and hence pin tract infections.

Figure 1

Pin tract infection in patient treated for non union tibia with Ilizarov ring fixator was managed by regular dressing with povidone iodine and isopropyl alcohol.



Figure 2

Pin tract infection in patient treated for fracture of 5th metacarpal. with regular pin tract care infection healed.



Figure 3

Pin tract infections in patient treated with ortho fix for fracture shaft of femur with bone loss and fracture tibia.



Figure 4

Pin tract infection around Steinman pin In a patient with intertrochanteric fracture treated conservatively with skeletal traction .



Figure 5

Pin tract infection around K Wire in patient operated for cubitus varus.



Figure 2

Pin tract infection in patient treated for fracture of 5th metacarpal. with regular pin tract care infection healed.



Figure 1

Pin tract infection in patient treated for non union tibia with Ilizarov ring fixator was managed by regular dressing with povidone iodine and isopropyl alcohol.



Figure 3

Pin tract infections in patient treated with ortho fix for fracture shaft of femur with bone loss and fracture tibia.



Figure 4

Pin tract infection around Steinman pin In a patient with intertrochanteric fracture treated conservatively with skeletal traction .



Figure 5

Pin tract infection around K Wire in patient operated for cubitus varus.



References

1. Noonan KJ, Price CT. Pearls and pitfalls of deformity correction and limb lengthening via monolateral external fixation. Iowa Ortho J. 1996;16:58–69.
2. Marsh JL, Smith ST, Do TT. External fixation and limited internal fixation for complex fractures of the tibial plateau. J Bone and Joint Surg. 1995;77-A:661–673.
3. Bonar S, Marsh JL. Unilateral external fixation for severe pilon fractures. Foot and Ankle.1993;14:57–64.
4. Respet PJ, Kleinman PG, Meinhard BP. Pin tract infections: A canine model. J of Ortho Research.1987;5:600–603.
5. Aro H T,Hein TJ,Chao EYS 1989 Mechanical performance of pin clamps in external fixators.248:246
6. Checketts RG,Otterburn M,maceachern G 1993 Pin track infections:Definition,incidence and prevention. Injury 24(8): 16
7. Mathew Varghese.External fixation of fractures.Watson –Jones Fractures and joint injuries 7th Edition 2009; 1138-1140

Author Information

Zameer Ali, DNB

SKIMS MEDICAL COLLEGE HOSPITAL (SKIMS MCH)

Lubna Khurshid, DNB

SKIMS MEDICAL COLLEGE HOSPITAL (SKIMS MCH)

Suhail Vakil, DNB

SKIMS MEDICAL COLLEGE HOSPITAL (SKIMS MCH)

Afshan Anjum, MS

SKIMS MEDICAL COLLEGE HOSPITAL (SKIMS MCH)

Shabir Dhar, MS

SKIMS MEDICAL COLLEGE HOSPITAL (SKIMS MCH)