Removal of 20 Years Old Broken Tension Band Wires from United Patella Fracture: A Rare Surgical Case with Review of Literature

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ABSTRACT

Breakage of tension band wires used to treat patella fracture, several years after surgery, is not uncommon. Broken wires may migrate to surrounding neurovascular structures, other vital organs like heart and may cause potentially fatal complications. Once the wires have been broken, it may be difficult to remove the broken pieces of metal wires. We report a 50 years old male patient with broken tension band wires at multiple sites. The broken wires were removed 20 years after the initial surgery without any undue complications. However, the patient sustained significant soft tissue injury in the attempt to remove all the pieces of broken wires that could otherwise have been safely removed within a year after fracture union.

KEY WORDS: Broken Wires, Cerclage wires, Migration, Patella fracture, Tension Band Wiring

INTRODUCTION

Tension band wiring with stainless steel wire is a gold standard technique to treat the patella fractures[1]. However breakage of wires is not uncommon several years after fracture fixation. Broken wires may migrate towards the surrounding soft tissue, neurovascular structures, other major organs like heart causing potentially fatal complications[2,3,4]. So it is advisable to remove the wires after the fracture has united. We report a case of removal of broken metal wires used for patella fracture in a 50 year old male patient 20 years after the initial surgery.

CASE REPORT

A 50 years old male patient came to our hospital with complaints of hardware irritation and occasional pain in his left knee. He had sustained patella fracture 20 years before and was treated with tension band wiring in some other hospital at that time. The fracture united without any undue complications and the patient had no problems for the past twenty years. Therefore, he did not remove the implant after fracture union despite advice by his operating surgeon to do so. He experienced discomfort and pain due to prominence of implants since the last one year. On examination there was prominent hardware and diffuse tenderness on the anterior surface of knee but there was no swelling, bursa formation or deformity of the knee joint. Antero-posterior and lateral views of the x-rays of knee joint showed that there were multiple broken pieces of tension band wires on the anterior aspect of patella. All the broken pieces of wires were removed one by one with the assistance of C-arm through an incision made over the previous transverse scar. The surgery was tedious involving multiple incisions on pre-patellar soft tissue which caused significant amount of iatrogenic soft tissue injury. The patient was allowed partial weight bearing with the assistance of crutches on the second post-operative day. Stitches were removed after two weeks and the patient was walking without pain two months after removal of implant.

DISCUSSION

The behavior of retained implants in patella fracture is different as compared to those in other bone fractures. In case of long bones once the fracture has united, the implants do not share the loading forces and are not prone to breakage even after a prolonged period of time interval. However, tension band and cerclage wires inside the quadriceps and patellar tendon in case of fractured patella are subjected to repetitive strain and loading forces even after the fracture has healed. In the course of time, these metal wires may eventually break if not removed[1]. Some authors still believe that a symptomatic implants can be retained indefinitely even in united patella fractures[5]. Once the fracture united, patients may not be interested to remove the implants for long periods of time unless they are troubled by pain and other serious complications. In such cases, tension band and cerclage wires are seen to break. Broken metal wires not only cause impingement on the skin and formation of bursa but can also migrate to surrounding soft tissues due to repeated movement of knee joint. There are many reports in the literature regarding the migration of K wires to heart from proximal humerus[6], distal radius[7], hip joint[8], sterno-clavicular joint[9] and acromio-clavicular joint[10]. Biddau[11] et al reported the migration of broken cerclage wires from patella into the heart 13 years after the initial surgery. Similarly Choi et al reported the migration of broken wires from fixed patellar fracture to the popliteal fossa and Hsu et al postulated intra-articular migration of broken wires from the patella.

The study of MakNin and Tai Sammy showed that there was no statistically significant difference between the age of patient in broken wire group and intact wire group. However, the difference was statistically significant for length of time from fracture fixation to removal of implant between the two groups of patients. Younger populations had higher cumulative risk of wire breakage as compared to the elderly population probably due to their longer life span rather than the activity level. Their study further quoted that incidence of wire breakage increases in the patients whose wires were removed more than or equal to 12 months. Repetitive loading forces and strain of both quadriceps and patellar tendon, even after the fracture united predispose to wire breakage. However use of relatively large diameter wire, application of wires applying the AO principles and use of good quality wire with higher modulus of elasticity prevents wire breakage to some extent[11].

In our case we removed multiple pieces of broken wires in united fracture patella 20 years after the initial surgery. It is one of the rare cases reported in the literature where broken wires were removed after a long time interval of time after surgery. Fortunately, the broken wire pieces did not migrate to surrounding neurovascular structures or other vital organs resulting in fatal complications. However, we had to give multiple incisions in the soft tissue resulting in significant iatrogenic soft tissue injury to remove all the pieces of wires, which slowed down the post-operative rehabilitation of patients even compared to the primary surgery. Therefore, we recommend removal of all the metal wires within twelve months of fracture union.

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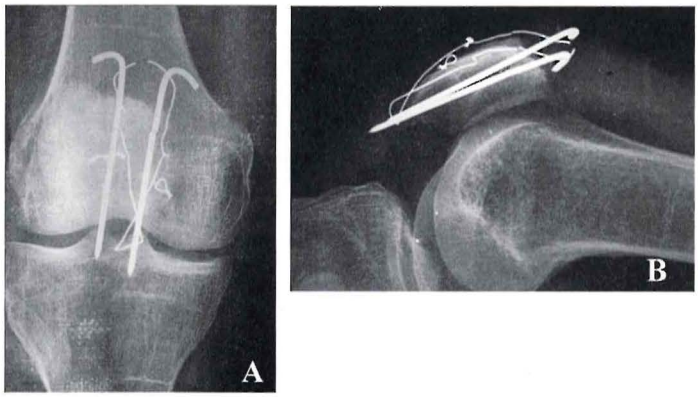

X-ray 1A: Antero-posterior and X-ray 2B: Lateral views of knee joint showing multiple pieces of broken stainless steel wires and K wires.

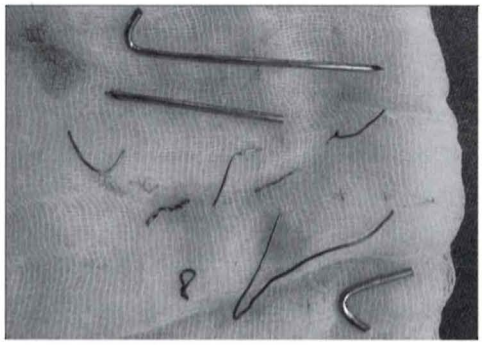

Fig.2 Multiple broken pieces of K wires and stainless steel wires after removal from the patella.

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