



Spontaneous Bilateral Quadriceps Tendon Rupture in a Hilly tribal Gujjar community Of Northern India - An unusual case series without any underlying risk factors

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Abstract

Introduction- The spontaneous and simultaneous rupture of both quadriceps tendons is uncommon and one without any risk factor has rarely been reported in the literature. We report an interesting case series of B/L simultaneous quadriceps rupture in 2 unrelated but heavy-duty laborer's, belonging to gujjar tribe of India, working in difficult hilly terrain of northern hilly region of India without any evidence of systemic diseases or any systemic drug use.

Methods- The cases were seen by corresponding author each during his tenure as senior residency and then in consultancy, both were investigated for any underlying predisposing causes and thorough history was taken. They were followed up for more than 2 years.

Results –Both patients had uneventful recovery and excellent knee scores after follow up.

Discussion- There is a literature available on spontaneous B/L quadriceps rupture but the cases were known to have some underlying pathology or chronic drug use/abuse. This is the only series where Occupational and cultural practises of a gujjar tribe of difficult hilly terrain is responsible for the simultaneous non traumatic rupture of quadriceps tendon.

Conclusion- Topography, Occupational activities, cultural and ethnical practices are an important part of disease understanding and should not be missed. Finding of similar pattern of a very rare B/L quadriceps injury in culturally and professionally similar individuals highlights the importance of growing insight into pattern of trauma for a better outcome and also for better prevention of such injuries.

Keywords: bilateral quadriceps rupture, spontaneous, tribal,

INTRODUCTION

Bilateral quadriceps ruptures and that too spontaneous is a very rare injury. However, it is the end result of some trauma but many predisposing conditions are associated to it. Without the evidence of any systemic disease or any systemic medicinal use such injuries are very common. The first case of bilateral quadriceps tendon rupture was reported by Steiner and Palmer in 1949.¹ The common medical conditions predisposing

to quadriceps rupture are, chronic renal failure, hyperparathyroidism multiple dialysis and diabetes. Crystal arthropathy, inflammatory arthritis and even obesity are also proven to be predisposing conditions in some individual case reports². Taking drugs such as quinolones and long-term use of systemic steroids are other underlying causes.

We report an interesting case series of 2 unrelated but heavy duty labourers, belonging to gujjar tribe³ of India, working in difficult hilly terrain of northern hilly region of India without any evidence of systemic diseases or any systemic drug use.

Gujjars are very hard-working nomadic tribe of Himachal Pradesh. They rear animals for their domestic and commercial activities, including buffalos, goats, and sheep. In summer, they migrate to the upper Himalayas along with their cattle; in winter, they walk down to plains, which make their lives extremely arduous. Selling ghee and milk is the chief source of their income. They are on the move all through the year and in the process carry heavy weights while moving steep uphill and downhill.

Patients And Methods-

Case-1.

It was first seen by corresponding author during his senior residency in year 2015 at Dr. R.P.G.M.C Kangra, India. He was 42 years of age belonging to Gujjar tribe and felt a sudden, burning ache in his left knee without trauma while walking Uphill carrying a load of 200 pounds containing utensils and ghee. Seconds later, while trying to stabilize and to prevent himself from falling he felt a burning ache in his right knee too and fell down. He could not raise nor control his legs and was brought down to department of orthopedics for management. Clinical and laboratory findings revealed no systemic diseases. Only positive history was of heavy laborious work since last 20 years. Xrays (fig-1) And USG (Fig-2) revealed B/L quadriceps rupture. MRI facility was not available at the place.

On examination he was unable to extend his both knees actively nor was able to raise his legs in supine position, however passive motion was still possible. Additionally, effusions and distinct suprapatellar gaps were found in both knees.

Case -2

It was seen by the same author in 2019 when he was assistant professor in a medical college situated in the tribal district of the state, Pt. J.L.N.G.M.C Chamba where maximum density of gujjar tribals is seen.

A 35 years male working as a shepherd while coming downhill suddenly fell onto his flexed knees doubling the legs beneath his body. There was severe Pain in his

both knees and could not raise or actively extend his knees.

On examination active knee flexion was not possible without any ability to extend. Mild hemarthrosis on both of his knees was present. Local tenderness and palpable suprapatellar gaps were found in his both knees (Fig- 3)

He was investigated for any underlying predisposing causes. His bone profile, renal function, blood glucose, serum uric acid and lipid profile were normal. He was HLA B27 negative and his body mass index was 29. Even on persistent questioning no history of any chronic drug use and abuse was given.

MRI confirmed the diagnosis.

No e/o similar injuries in their families or ancestors were known to them.

Surgical Procedure

Since both cases were of traumatic spontaneous B/L quadriceps rupture both were operated using the conventional repair technique. No tendon degeneration or any striking abnormality were seen intraoperatively both in bone and soft tissue. Bilateral quadriceps surgical repairs were performed using mid-line incisions over the knees, and the ruptured ends of the quadriceps tendons were identified. The ruptured ends were freshened and repaired using Ethibond n0-5 sutures through drill holes in the patella to the tendons (Fig-5). It was also discovered that the retinaculæ on both of his knees were torn. Medial and lateral retinacular repair was performed using Vicryl 2-0 and 1-0 sutures.

Post-operatively, the patient was immobilized first in bilateral cylinder casts for six weeks, then in hinged knee braces for the next four weeks. His knees were actively mobilized during physiotherapy. The physiotherapy protocol was initially active knee range of motion exercises, which were followed by passive assisted and polymeric exercises. The patient had an uneventful post-operative recovery and was able to perform straight leg raises without a lag by the time of his three-month follow-up examination.

Results

Case 1 was followed up for 4 years- His final knee range of motion was 0° to 125° in both legs after a full course of Physiotherapy. He was advised guarded restart of his normal routine after years post-surgery.

Four years after the surgery, he had an excellent result with full active extension. (Fig-6) His Tegner-Lysholm score⁴ four years after the operation was 99, which is categorised as "excellent".

Case 2- is followed up for 2 years since 2019. He was given regular physiotherapy in clinic for 6 weeks initially for 4 week he was applied long leg knee brace (fig-7)

The patient made an uneventful recovery, without any complaints and performing all of his occupational and daily routines without limitation of knee motion or decrease of muscle strength. He is still on follow up. However, he is advised not to bear heavyweights while uphill. Knee society score⁵ average was 76.8 which is rated as excellent at 2 years.

Discussion

In a review done by Neuber et al² only 105 cases of B/L Spontaneous quadriceps rupture was found. all of them had some risk factors or abnormalities.

However spontaneous quadriceps tendon rupture without any underlying abnormality/ risk factor does not exist in the literature.

A sporadic case of such injury was seen in a weightlifter but that was associated with spiral fracture of tibia⁶.

Lio et al⁷ stated a similar spontaneous injury in an athlete but on further questioning it was found to be due to continuous use of anabolic steroids.

In 1959 Anzel et al⁸ stated that heavy duty labourers and athletes are at a higher risk of tendon ruptures in general.

Closed quadriceps rupture is considered to be caused most often by a forced contraction of the quadriceps muscle with the knee in a flexed position and a fixed foot^{9,10}. Similar mechanism of injury was seen in our Case 2. On the other hand, quadriceps tendon can resist considerable loads. Mc Master¹¹ demonstrated in experimental work that approximately 50% of a healthy tendon's tissues have to be severed to achieve a rupture. So it is commonly accepted that impairment of the tendon's ultrastructure by a risk factor which in our 2 cases was chronic exertional use as a result of cultural and occupational practices of these tribal people.

Keogh et al.¹² in their study pointed out that a prolonged knee-flexion over 90 renders an extensive area of contact between the tendon and the distal femur and thus may create a circumscribed ischemia of the tendon. Gujjar tribes have a tradition of sitting in squatting position for a long periods³ and also frequent rearing of their livestock and climbing of hills can lead to ischemia in their tendon ultrastructure over a longer period of time leading to such spontaneous rupture.

Neuber et al² stated that Occupational or recreational activities straining the quadriceps tendon are not considered as true risk factors but this is inconsistent with our study where 2 healthy young individuals with normal parameters suffered B/L rupture during their routine activity.

However Occupational or recreational activities contributing in the development of tendon lesions due to repeated microtraumas is discussed by many studies^{12,13,14}

Conclusion- Topography, Occupational activities, cultural and ethnical practices are an important part of disease understanding and should not be missed. Finding of similar pattern of a very rare B/L quadriceps injury in culturally and professionally similar individuals highlights the importance of growing insight into pattern of trauma for a better outcome and also for better prevention of such injuries.

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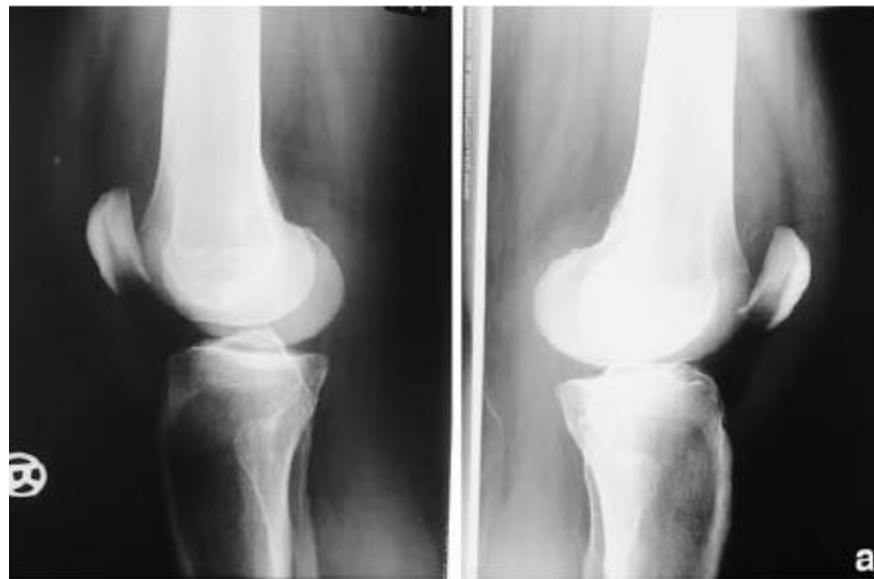


Fig- 1 Xrays showing low riding and anterior fall of tibia in both the legs



Fig- 2 USG reveals bilateral hematoma formation and disruption of the tendon's echoes near the patellar insertion



Fig- 3 Palpable gaps (in red) felt on passive flexion and extension of the patient



Fig-4 MRI scan showing Complete rupture of B/l Quadriceps with hematoma formation

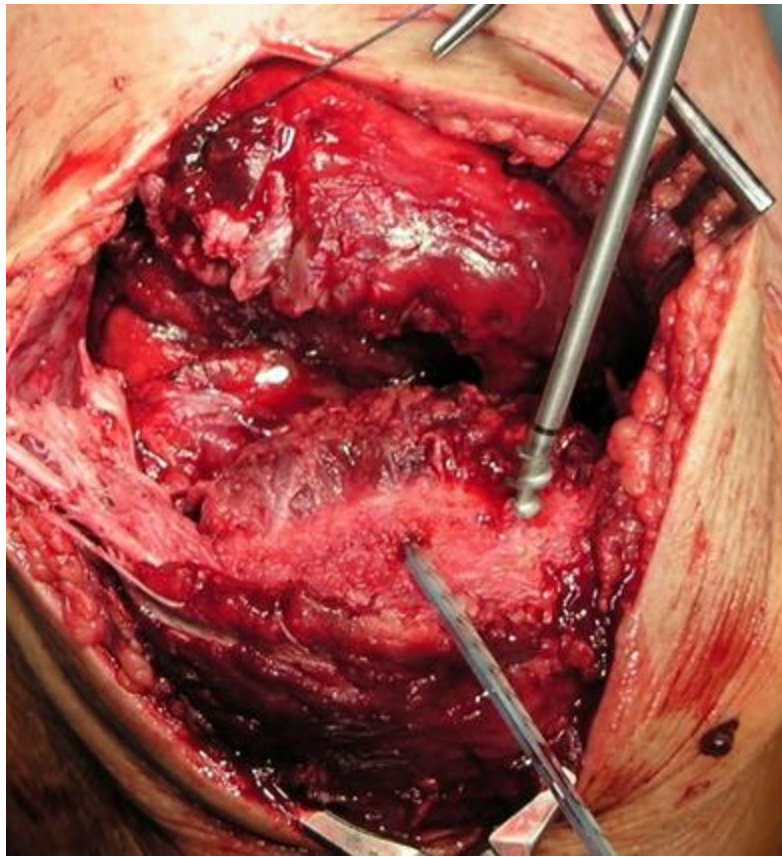


Fig- 5 Intraoperative picture demonstrating cut quadriceps tendon and drilling of bone holes for passing ethibond suture.



Fig-6 Near complete knee ROM after 4 years.



Fig- 7 Hinged long leg knee Brace