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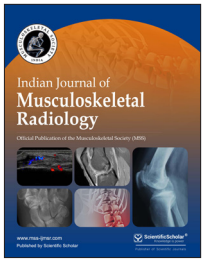

Original Article

An assessment of the incidence and significance of pes anserine exostoses

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ABSTRACT

Objectives: The aim of this study was to assess the incidence and significance of pes anserine exostosis.

Material and Methods: A retrospective search of radiological reports of an individual radiologist over a 12-year period with the term "anserine" was performed.

Results: There were 34 pes anserine exostoses which arose at an average of 3.6 cm from the medial joint line. The average incidence of pes anserine exostosis is 1 in 1500 patients undergoing radiographs of one or both knees.

Conclusion: Pes anserine exostosis is an incidental finding and is of doubtful clinical significance with no evidence of associated pes anserine bursitis. This is the largest series of pes anserine exostosis.

Keywords: Exostosis, Pes anserine, Incidence

INTRODUCTION

An exostosis is defined as a benign outgrowth of bone projecting from the outer cortex. The term is synonymous with osteochondroma, also known as cartilage-capped exostosis, but is also used with other bony excrescences such as subungual exostosis and turret exostosis. Osteochondroma is the most common of all exophytic bone lesions and a useful distinguishing feature is the radiographic identification of continuity of the marrow and cortex with the underlying bone. This helps differentiate osteochondroma from the other forms of exostosis as well as diverse bone-forming surface lesions such as osteoma, bizarre parosteal osteochondromatous proliferation, periostitis ossificans, and parosteal osteosarcoma.[1-3] There is, however, one exception where there is also continuity of marrow and cortex between the bony outgrowth and the parent bone. This is the pes anserine exostosis. This rare form of exostosis arises from the medial aspect of the proximal tibia and the purpose of this retrospective study was to attempt to assess its incidence and significance.

MATERIAL AND METHODS

This retrospective study was performed in the setting of a specialist orthopedic hospital. A computerized search was conducted of all the reports issued by the senior author on a departmental PACS from August 2009 to March 2020. All the reports in which the term "anserine" was included were recorded. The radiographs and any other imaging on the PACS were reviewed

to identify those cases in which an exostosis arising from the medial aspect of the proximal tibial metaphysis was present. These cases form the basis of this study. The medical records were reviewed to ascertain the presenting complaint and subsequent management. In addition, a further computerized search was undertaken to establish the total number of knee radiographs the same radiologist had reported in the 12-year period. Institutional Board Approval was obtained for this retrospective study. The MRI's of patients from this cohort was also analyzed.

RESULTS

A total of 81 reports issued by the same radiologist over 12 years included the term "anserine." Review of the radiographs on a PACS workstation identified 31 patients with pes anserine exostosis. Sixteen patients were male and 15 female. They were divided into two cohorts according to pre- and post-skeletal fusion, first cohort with an age range of 7–19 years of age (10 patients with a mean age of 14 years) and second cohort with age range of 41–89 years of age (21 patients with a mean age of 61 years). The exostoses were identified as bilateral in 3 cases, unilateral in 12 cases (6 left and 6 right sided) in which there were bilateral imaging and unilateral in 16 cases (8 left and 8 right sided) but only the one knee had been imaged in these cases. All the exostoses arose from the identical medial aspect of the proximal tibial metaphysis. In the adult patients, they were 2–4.2 cm (mean 3.6 cm) caudal to the medial joint line. In the patients pre-skeletal fusion, they arose at a similar distance from the medial joint line 3.1 cm (range 2.1–4.3 cm). All comprised a pointed bony spur up to 2.2 cm in length, projected away from the knee joint. In all but the smallest examples, there was trabecular bone in continuity with the underlying marrow of the tibial metaphysis on radiographs.

MRI studies were available for review in 12 cases and both MRI and CT in 4. None of the cross-sectional studies had been primarily performed to demonstrate the spurs. MRI was performed for knee pain unrelated to the pes anserine exostosis, which included for a meniscal tear, patellofemoral pain, and anterior knee pain. None of the MRI scans showed a fluid-like mass lesion in relation to the spurs or deep to the pes anserine tendons to suggest bursitis. In all 12 MR examinations with spurs, there were adequate axial images to delineate the medial soft-tissue structures. These revealed that both the gracilis and semitendinosus portions of the pes anserine complex were remote from the spurs and that the sartorius tendon passed behind and inferior to the spur with a thin intervening fat plane. It was the tibial collateral ligament that was shown to pass over and to be split by the spur. In all patients, the spur was between the tibial component of the superficial medial collateral ligament (MCL) and gracilis but not attached to either [Figures 1-4]. Two cases had surgical excision which demonstrated an exostosis without a cartilage cap.

In the study period, the individual radiologist reported radiographs of the knee in a total of 51,507 patients (38085 single knee and 13,422 bilateral knee examinations). This equates in this hospital-based study to an incidence of pes anserine exostosis of approximately 1 in 1500 patients undergoing radiography of one or both knees.

DISCUSSION

The term pes anserinus is derived from the Latin for foot (pes) and goose (anserinus).[4] It refers to the conjoined tendons of the sartorius, semitendinosus, and gracilis muscles as they pass around the posteromedial aspect of the proximal tibia. It is because of this anatomical location that bony spurs arising at this site have been called pes anserine exostoses.[5] They all arise at a uniform site on the medial aspect of the proximal tibia, 3.6 cm below the medial joint line give or take only several millimeters. They exhibit consistent radiographic appearances of a bony spur, likened to a small icicle or rose thorn, and oriented away from the joint.[6-9] Histological examination of resected spurs shows an exostosis without a cartilage cap, thereby differentiating this condition from a conventional osteochondroma.[5-7] This finding was confirmed in the two cases that underwent surgical excision in the current series.

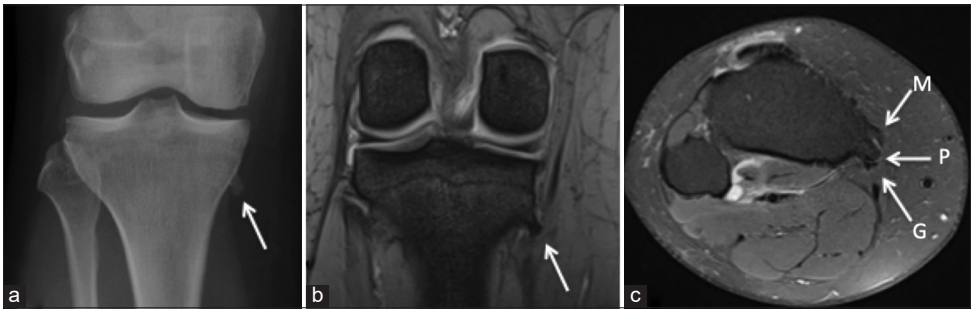

Figure 1: Anterior-posterior radiograph (a) and STIR coronal (b) and axial (c) showing the pes anserine exostosis (arrow) (P) between the tibial component of the superficial medial collateral ligament (M) and gracilis (G).

In the past, pes anserine exostoses have been considered normal variants or possibly "tug lesions."[10,11] "Tug lesions" are non-neoplastic, reactive lesions that occur at the origin or insertion of major muscles due to repetitive forces (the "tug") exerted by the muscles on the underlying cortex and periosteum. The cortical irregularity syndrome (aka periosteal desmoid) on the posteromedial aspect of the distal femoral metaphysis is the most widely recognized example around the knee but this pathogenesis seems unlikely in the case of the pes anserine exostosis. Tug lesions are oriented along the line of the soft-tissue structure associated with the repetitive trauma. At this site from the proximal tibia, one would expect the exostosis to be angled toward (cephalic) rather than away (caudal) from the knee if related to the insertion of the conjoined pes anserine tendon.[6,7] "Tug lesions" also present as surface bone-forming lesions, with or without cortical erosion, and do not have trabecular continuity with the underlying medullary bone.

Old series linked pes anserine spurs in children with pes anserinus syndrome comprising pain and swelling over the proximal tibia with occasionally a catching/locking sensation.[6,7] These studies predated the use of MRI of the knee. Isolated examples on MRI of a pes anserine bursitis together with a spur, called an enthesophyte, have been reported,[5,12] but it is of note that most descriptions of the typical MRI appearances of pes anserine bursitis make no mention of any association with exostoses.[8,9,13-15] Pes anserine bursitis is also described as arising closer to the knee joint usually located 2 cm (and not 3.6 cm) below the medial joint line deep to the tendons and not at a tendon insertion.[15] There was no MRI evidence of pes anserine bursitis in our study.

The limited MRI studies available for review in this study do suggest that the spurs are more closely related to the distal tibial collateral ligament rather than the pes anserine complex. This begs the question as to whether the spurs are analogous to the post-traumatic calcification/ossification of the proximal tibial collateral ligament (Pellegrini-Stieda disease). This seems unlikely as the mineralization patterns that can be seen in Pellegrini-Stieda disease again tends to be oriented toward and not away from the joint.[16] Furthermore, on MRI, Pellegrini-Stieda disease is typically associated with some chronic thickening of the femoral insertion of the superficial component of the MCL. In none of the cases included in this series was any thickening of the distal MCL identified to suggest prior injury as a potential cause.

The biphasic age distribution seen in the current series is probably spurious reflecting patient selection bias. This retrospective study was performed in a non-acute unit where most patients presenting with non-traumatic orthopedic complaints tend to be the young or the middle aged and elderly. The presence in adults refutes one author's suggestion that pes anserine exostoses appear during the 5th or 6th year of life and disappear after 3 or 4 years.[17]

The pes anserine exostosis could be developmental in origin similar to the supracondylar process of the humerus that may also be unilateral or bilateral.[18,19] This process is believed to represent a phylogenetic vestige of a supracondylar foramen found in some mammals and reptiles.[20] However, the authors are unaware of any anatomical description of a fibrous band, analogous to Struther's ligament, in association with pes anserine exostoses and the resected cases in the current series showed no evidence of any surface soft-tissue attachment.

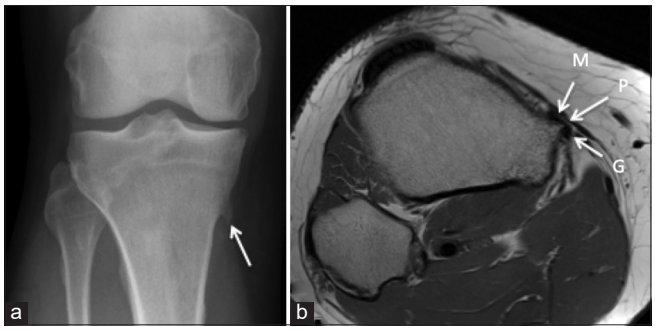

Figure 2: Anterior-posterior radiograph (a) and T1 axial (b) showing the pes anserine exostosis (arrow) (P) between the tibial component of the superficial medial collateral ligament (M) and gracilis (G).

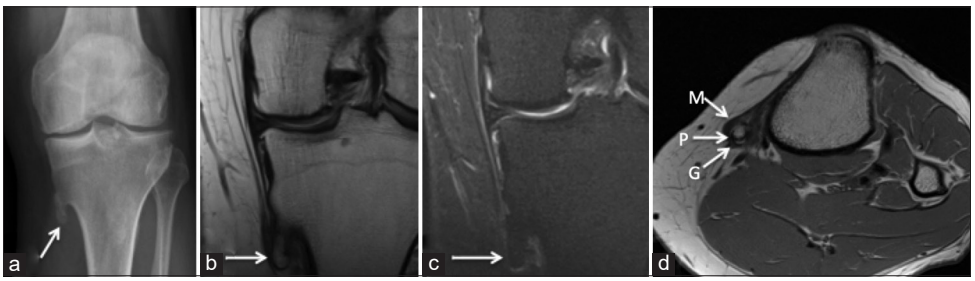

Figure 3: Anterior-posterior radiograph (a), T1 coronal (b), STIR coronal (c), and T1 axial (d) showing the pes anserine exostosis (arrow) (P) between the tibial component of the superficial medial collateral ligament (M) and gracilis (G).

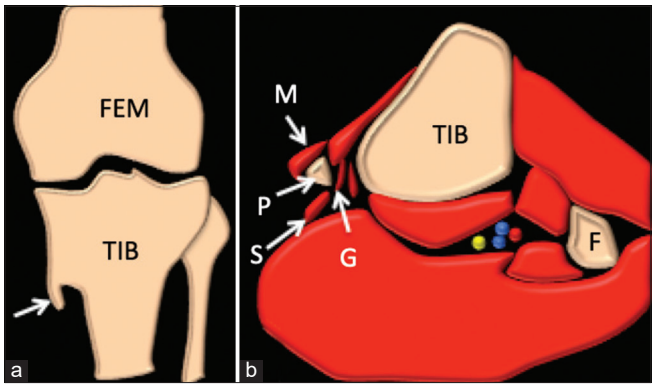

Figure 4: Coronal (a) and axial (b) diagrams of the knee showing the pes anserine exostosis (arrow) (P) between the tibial component of the superficial medial collateral ligament (M) and gracilis (G) S gracialis (G), semitendinosus (S).

CONCLUSION

The current study confirms the classic site and appearance of the pes anserine exostosis arising as a bony spur from the medial aspect of the proximal tibial metaphysis projecting away from the knee joint. It may be unilateral or bilateral and is seen in approximately 1 per 1500 patients, in both children and adults, undergoing radiography of the knees for various orthopedic complaints. It is unlikely to be of traumatic origin and is of doubtful clinical significance with no evidence of associated pes anserine bursitis or adjacent tendon pathology. This is the largest series of pes anserine exostosis.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Nil.

Conflicts of interest

Dr. Rajesh Botchu is on the Advisory Board of this journal. He does not have any competing interest.

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