Risk Factors for Pes Anserinus Tendinitis/Bursitis Syndrome

A Case Control Study

José Alvarez-Nemegyei, MSc

Background: Pes anserinus tendinitis/bursitis (PATB) is a frequent cause of knee pain. Its predisposing factors are still controversial.
Objectives: Assess the effect of a set of demographic, clinical, somatometric, and biomechanical factors on the risk for PATB.
Methods: A case control design was used to evaluate the association between clinically diagnosed PATB and the presence of diabetes; knee osteoarthritis (and its radiographic severity); obesity; knee collateral, and anteroposterior instability; and knee or hindfoot malalignment.
Results: Twenty-two consecutive, incident PATB patients were included; all were females 62.1 ± 11.5-year-old (limits 45–82). Thirty-eight sex- and age-matched (59.8 ± 9.4-year-old; $P = 0.41$) subjects were used as controls; these had asymptomatic osteoporosis (20) and a series of rheumatic syndromes (18). There was no difference in prevalence of diabetes, knee osteoarthritis, obesity, knee instability, varus knee deformity, and hindfoot malalignment between cases and controls. Furthermore, no difference in overall, lateral, medial, and patellofemoral knee osteoarthritis radiographic severity mean score was found between study groups. The presence of valgus knee deformity alone (OR: 5.2; 95% CI: 1.1–25.5), or in combination with collateral instability (OR: 6.0; 95% CI: 1.4–26.0), was identified as associated with PATB.
Conclusions: Valgus knee deformity, alone or in association with collateral instability, seems to be a risk factor for PATB. No association was found between PATB and some conditions previously reported as predisposing factors such as diabetes, knee osteoarthritis, and obesity. PATB should be kept in mind as a highly probable diagnosis in mature women with medial knee pain and valgus knee deformity.

Key Words: bursitis, knee, risk factors, tendinitis, pes anserinus

(*J Clin Rheumatol* 2007;13: 63–65)

Pes anserinus tendinitis bursitis (PATB) syndrome refers to a disorder that is one of the most frequent soft tissue pain syndromes affecting the knee. It has been consistently reported in mature and obese women, and its symptoms include knee pain and tenderness on the knee's inferomedial aspect.[1–3] Though frequent, there are still large knowledge gaps about its etiology and pathogenesis.[3] Despite several recent efforts using ultrasonography and MRI to analyze the diseased structure, the pes anserinus, the anserine bursa, or any other knee structure, none of these have been consistently found to be faulty in the majority of PATB-diagnosed subjects.[3–7] This suggests the present syndrome nomenclature may be a misnomer. Controlled reports on the risk factors leading to the syndrome are also remarkably scarce.[3] Studies of some case series have suggested that knee osteoarthritis and obesity are associated conditions with PATB.[2,5,6] However, only 2 controlled, cross-sectional reports assessing an etiologic association for PATB have been published, and both report presence of diabetes mellitus to be a predisposing factor for development of PATB.[8,9] In response to the lack of comparative analytical methodology in research of PATB risk factors, a case control study design was applied to reevaluate the association between some factors reported as predisposing to PATB, such as obesity, diabetes, and knee osteoarthritis. Assessment was also done of the effect of some lower limb biomechanical anomalies, such as knee or ankle malalignment, and knee instability, on PATB risk.

MATERIALS AND METHODS

Subjects

Between October 2004 and December 2005, consecutive, incident patients were recruited who had been referred by primary care providers of the Mexican Institute of Social Security (Instituto Mexicano del Seguro Social – IMSS) in Mérida, Mexico, to the Rheumatology Service at the Ignacio García Téllez National Medical Center (a tertiary care facility). A PATB case was considered to be any subject with knee pain that compelled him/her to seek medical care, in addition to all of the following conditions: pain perceived in the knee's inferomedial aspect, painless passive mobilization of the knee, absence of knee swelling, and tenderness specifically elicited when an area of the proximal tibial epiphysis situated 2–3-cm below the medial knee joint was pushed manually. Age- and sex-matched subjects referred to the same medical facility for any rheumatologic condition, and for whom a PATB diagnosis was specifically excluded, were included as controls. Patients with any inflammatory arthropathy such as rheumatoid arthritis, acute gouty attack, and

From the Unidad de Investigación Médica, Unidad Médica de Alta Especialidad Yucatán, Instituto Mexicano del Seguro Social, Mérida, Yucatan, Mexico.
Reprints: José Alvarez-Nemegyei, MSc, MD, Calle 21 # 332 x 10 y 12, Fracc, San Esteban, C.P. 97119, Mérida, Yucatan, Mexico. E-mail: nemegyei@yahoo.com.mx.

ISSN: 1076-1608/07/1302-0063
DOI: 10.1097/01.rhu.0000262082.84624.37

ankilosing spondylitis were not included. Every subject with an incomplete study protocol was eliminated from the study.

Measurements

A previous diagnosis of diabetes mellitus was made through patient interviews. Body mass index (BMI) was calculated according to Quetelet formula and then the WHO BMI cutoff (BMI $\geq$30) used to diagnose obesity.[10] Diagnosis of knee osteoarthritis was made based on the American College of Rheumatology criteria for osteoarthritis classification and reporting.[11] Cooper et al.'s scale was used to measure the overall and unicompartimental (lateral, medial, and patellofemoral) radiographic severity of the knee osteoarthritis.[12] Presence of knee and hindfoot malalignment were surveyed by clinical examination with the patient in a standing position. Presence of knee collateral and anteroposterior instability was recorded as follows: Knee collateral instability was deemed present when an abnormal side displacement of the distal leg was observed by the examiner when valgus or varus stresses were applied to the knee in full extension. Knee anteroposterior instability was defined as a positive finding for the Lachman or posterior drawer maneuvers.

Methods

After entering the study, subjects were interviewed to record their complete clinical history, including historical, somatometric, and clinical variables. They were then given an appointment for a second interview during which anteroposterior and lateral projections of knee radiography were done. In this second interview, radiographic severity of the knee osteoarthritis was determined and recorded.

Ethical Aspects

Every subject signed an informed consent before inclusion in the study, and the protocol was approved by the Research and Ethics Committee of the Ignacio Garcia Téllez Hospital.

Statistical Methods

A χ^2 with Yates correction or Fisher tests were used for comparison of categorical variables. The odds ratio (95% confidence interval) was determined when a significant *P* level was identified for these variables. Numerical variables were compared using the unpaired *t*-test. Data were analyzed using the SPSS for Windows (version 7.5) statistical software (SPSS Inc.). The statistical significance level was set at 0.05.

RESULTS

Twenty-two PATB patients were included, all of whom were female and mature in age (62.1 $\pm$ 11.5-year-old; limits 45–82). Of these, 10 presented right-sided PATB and 12 left-sided PATB; symptom duration was 13 $\pm$ 15 weeks (limits 1–100). The control group consisted of 38 females (59.8 $\pm$ 9.4-year-old). There was no statistical difference between the age groups ($P = 0.41$). Diagnoses of control group patients were: 20 with asymptomatic osteoporosis; 5 with hand osteoarthritis; 4 with hand tendinopathy; and a single subject each with trochanteric bursitis, sciatica, elbow epicondylitis, meralgia parestesica, heel pain, shoulder tendinitis, ankle pain, lower back pain, and carpal tunnel syndrome.

No statistical difference between cases and controls was observed in the prevalence of diabetes, knee osteoarthritis, obesity, knee varus deformity, collateral and anteroposterior knee instability, and hindfoot malalignment. In addition, no difference between study groups was observed in overall or unicompartimental knee osteoarthritis severity radiographic scores. Valgus knee deformity, identified in 8 of 21 (38.1%) cases compared with 4 of 38 (10.5%) controls (OR: 5.2; 95% CI: 1.1–25.5), was the only single variable associated with PATB. The combined presence of valgus knee deformity and knee collateral instability resulted in a further increase in PATB risk (OR: 6.0; 95% CI: 1.4–26; Table 1).

TABLE 1. Comparison of the Studied Variables Between Cases and Controls

Variable	Cases	Controls	*P*
Diabetes	2/22 (9.1)	2/38 (5.3)	0.97
Knee osteoarthritis	11/22 (50)	16/38 (42.1)	0.74
Varus knee deformity	1/21 (4.8)	1/38 (2.6)	1.00
Valgus knee deformity	8/21 (38.1)	4/38 (10.5)	0.02
Knee collateral instability	4/22 (18.2)	1/38 (2.6)	0.10
Valgus knee deformity plus knee collateral instability	10/21 (47.6)	5/38 (13.2)	0.009
Knee anteroposterior instability	0/22	0/38	—
Varus deformity of the hindfoot	1/22 (4.5)	1/38 (2.6)	1.00
Valgus deformity of the hindfoot	2/22 (9.1)	0/38	0.27
Obesity	16/22 (72.7)	21/38 (55.3)	0.28
Overall knee osteoarthritis severity radiographic score*	5.1 $\pm$ 4.4	4.7 $\pm$ 4.5	0.72
Medial compartment knee osteoarthritis severity radiographic score*	1.6 $\pm$ 1.4	1.7 $\pm$ 1.7	0.82
Lateral compartment knee osteoarthritis severity radiographic score*	1.2 $\pm$ 1.3	1.2 $\pm$ 1.5	0.97
Patellofemoral compartment knee osteoarthritis severity radiographic score*	2.1 $\pm$ 2.1	1.6 $\pm$ 1.8	0.48

Values inside parentheses indicate percentages.
*Mean $\pm$ SD.

DISCUSSION

After performing a case control study, the presence of valgus knee deformity, alone or in combination with knee collateral instability, was identified as a risk factor for PATB. Other conditions reported as predisposing for PATB, such as diabetes, obesity, and knee osteoarthritis (and its radiographic severity score), were not identified as increasing PATB risk in the present study. Biomechanical disorders of the lower limbs such as varus knee deformity, anteroposterior instability, isolated collateral instability, and hindfoot malalignment were also not found to be associated with PATB development.

The present results support previous findings that PATB is a condition that preferentially affects mature women.[2,3] However, due to the study design, in which sex and age were the matched variables, the effect of these factors on PATB risk could not be assessed.

In most of reports addressing the issue, be they original or review reports,[2,3,5,6] the presence of obesity and knee osteoarthritis are consistently mentioned as predisposing conditions for PATB. However, this notion is based on uncontrolled and/or cross-sectional sources,[5,6] meaning the theory supporting knee osteoarthritis and obesity as PATB risk factors has never been previously tested using an analytical methodology. The disparity between the present results and previous reports on the issue (aside from methodological approach) may stem from the fact that PATB appears to affect a population in which knee osteoarthritis and obesity are frequent comorbid conditions.

In 2 earlier controlled, cross-sectional studies, the presence of PATB was strongly associated to a type 2 diabetes mellitus previous diagnosis when compared with a nondiabetic population.[8,9] These results clearly do not coincide with the present study in which diabetes was not identified as a PATB risk factor. This difference may originate from the different populations used in each study. In Cohen et al. and Unlu et al., PATB diagnosis was possibly just a finding, since they based their studies on a population generated by searching clinical data compatible with a PATB diagnosis using a questionnaire for knee pain and tenderness in the pes anserinus site. This is apparently supported by a recent report that 30% of asymptomatic people report tenderness when the pes anserinus site is pushed.[5] The PATB patients in the present study, however, reported knee pain as the main clinical complaint that compelled them to seek medical attention. This clinical situation is probably more representative of the PATB patient.

In some case reports and case series presence of distention of the anserine bursa detected by MRI has been correlated with a clinical picture highly suggestive of PATB syndrome.[7,13] In another retrospective study, however, no correlation was found between pes anserine bursa swelling detected by MRI and presence of medial knee pain.[14] Furthermore, evidence from prospective controlled studies using ultrasonography as the image modality has consistently failed to correlate any pes anserine bursa or tendon anomaly or of any other medial knee structure with presence of clearly defined and clinically sound PATB syndrome.[4,9] It seems, therefore, that the faulty structure in most PATB patients remains unidentified, and that the search for the origins of PATB is better refocused on a disorder of a medial knee structure other than the pes anserine complex. The medial knee collateral complex, particularly its superficial layer, is a promising candidate based on the thigh anatomic relationship between the anserine complex and the tibial insertion of the collateral medial ligament superficial layer,[15] immediately underlying the area where pain is perceived in PATB patients. Recent experimental evidence has shown that valgus loading of the knee significantly increases strain on the medial collateral ligament.[16] Therefore, if the associations observed here are accurate, an argument can be made for diagnostic image-controlled prospective studies focused on evaluating a valgus deformity-driven ligamentopathy of the superficial knee collateral ligament as a possible etiologic contributor for PATB.

In conclusion, PATB preferentially affects mature women in whom the presence of valgus knee deformity, alone or in combination with knee collateral instability, was identified as risk factor for its development. Clearly, more research is needed on the risk factors and diseased structure in the syndrome currently known as pes anserinus tendinitis bursitis.

REFERENCES

1. Moschcowitz E. Bursitis of the sartorius bursa: an undescribed malady simulating chronic arthritis. *JAMA*. 1937;109:1362.
2. Arromdee E, Matteson EL. Bursitis: common condition, uncommon challenge. *J Musculoskel Med*. 2001;18:214–224.
3. Alvarez-Nemegyei J, Canoso JJ. Evidence based soft tissue rheumatology. III. Anserine bursitis. *J Clin Rheumatol*. 2004;10:205–206.
4. Uson J, Aguado P, Bernad M, et al. Pes anserinus tendino-bursisis: what are we talking about? *Scand J Rheumatol*. 2000;29:184–186.
5. Yoon SH, Kim SE, Suh YR, et al. Correlation between ultrasonographic findings and the response to corticosteroid injection in pes aserinus tendinobursitis syndrome in knee osteoarthritis patients. *J Korean Med Sci*. 2005;20:109–112.
6. Kang I, Han SW. Anserine bursitis in patients with osteoarthritis of the knee. *South Med J*. 2000;93:207–209.
7. Rennie WJ, Saifuddin A. Pes anserine bursitis: incidence in symptomatic knees and clinical presentation. *Skeletal Radiol*. 2005;34:395–398.
8. Cohen SE, Mahul O, Meir R, et al. Anserine bursitis and non-insulin dependent diabetes mellitus. *J Rheumatol*. 1997;24:2162–2165.
9. Unlu Z, Ozmen B, Tarhan S, et al. Ultrasonographic evaluation of pes anserinus tendino-bursitis in patients with type 2 diabetes mellitus. *J Rheumatol*. 2003;30:352–354.
10. World Health Organization. Available at: http://www.who.int/dietphysicalactivity/publications/facts/obesity/en/.
11. Altman R, Asch E, Bloch D, et al. Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of knee. Diagnostic and Therapeutic Criteria Committee of the American Rheumatism Association. *Arthritis Rheum*. 1986;29:1039–1049.
12. Cooper C, Cushhaghan J, Kirwan JR, et al. Radiographic assesment of the knee joint in osteoarthritis. *Ann Rheum Dis*. 1992;51:80–82.
13. Forbes JR, Helms CA, Janzen DL. Acute pes anserine bursitis: MR imaging. *Radiology*. 1995;194:525–527.
14. Hill CL, Gale DR, Chaisson CE, et al. Periarticular lesions detected on magnetic resonance imaging: prevalence in knees with and without symptoms. *Arthritis Rheum*. 2003;48:2836–2844.
15. Robinson JR, Sanchez-Ballester J, Bull AM, et al. The posteromedial corner revisited. An anatomical description of the passive restraining structures in the medial aspect of the human knee. *J Bone Joint Surg*. 2004;86B:674–681.
16. Gardiner JC, Weiss JA. Subject-specific finite element analysis of the human medial collateral ligament during valgus knee loading. *J Orthop Res*. 2003;21:1098–1106.