The Achilles heel of adults and children
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INCIDENCE OF CALCANEAL APOPHYSITIS IN THE GENERAL POPULATION

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ABSTRACT

Background: Calcaneal apophysitis, or Sever’s disease, is a traction apophysitis. It is a frequent cause of heel pain in children. Knowledge about the exact incidence of calcaneal apophysitis in the general population, however, is lacking.

Methods: From 34 general practices, records of patients between 6 and 17 years, visiting the general practitioner (GP) were analysed. Diagnoses of calcaneal apophysitis were counted using computerised registration networks of GPs in 2008, 2009 and 2010.

Results: There were 16,383 SOAP files searched and a number of 61 pediatric patients with calcaneal apophysitis were established over the years 2010, 2009, 2008, showing an incidence of 3.7 in 1000 registered patients.

Conclusion: This is the first report on incidence rates of calcaneal apophysitis in general practice. With an incidence of 3.7 in 1000 registered patients it is a common pathologic entity, which requires more research on pathophysiology and therapy. The actual incidence may be higher due the strict inclusion criteria of this study.
INTRODUCTION

Calcaneal apophysitis, or Sever’s disease, appears to be a quite common cause of heel pain in pediatric patients [10]. Symptoms present around the age of 11-15 years in boys and 8-13 years in girls[5]. These symptoms consist of heel pain, during or directly after activity. In recalcitrant cases symptoms may be present at rest. Treatment is conservative, for instance rest, stretching, calf musculature strengthening, a heel raise inlay and in severe cases prolonged casting[6;7;10;12]. The incidence of calcaneal apophysitis amongst other musculoskeletal injuries has been reported to be between two and 16%[10]. Additionally an increased incidence has been reported in active pediatric patients[6]. A previous study reported the incidence of non-specified heel pain in Dutch pediatric patients aged 0-17, which was found to be 1.7 per 1000 registered persons[3]. However, no differentiation between pathologies was made[3]. Incidence rates are useful for studying trends in occurrence of diseases, future intervention studies, and for burden of disease estimates[2]. This is specifically important for calcaneal apophysitis as it is relatively easy to treat, but known to cause a significant decrease in the quality of life of affected pediatric patients [9]. Furthermore, increased knowledge about calcaneal apophysitis may provide necessary awareness in the diagnostic process and thus to earlier treatment. Finally incidence rates are an important study tool for the methodological design of future (intervention) studies. The purpose of this study was to analyse the incidence of calcaneal apophysitis in the Dutch general practitioner’s (GP) practice.

METHODS

A cross-sectional study within the Dutch general practice setting was designed. In the Netherlands, every non-institutionalised inhabitant is registered in a GP practice. Data was obtained from a digital registration system of six primary care health centers were 34 GP practices containing 45839 registered patients: all members of the HAG-net-AMC registration network[11]. All GP representatives were approached for participation. All electronic patient files of participating practices were searched. In the Netherlands, every GP documents consultation data digitally according to acronymic SOAP files system; this system divides data of each consult in symptoms S(Subjective), signs O(Objective), working hypothesis/ diagnosis A(Assessment) and plan for treatment P(Plan).

To analyse the total number of patient with calcaneal apophysitis, SOAP files of pediatric patients aged between 6 and 17 years from 2008, 2009 and 2010 were extracted and searched, using the following terms: “sever, calc, achil, foot, heel, enthes, enchond and osteochondr”. Subsequently all files were manually and independently analysed by two observers. For the diagnosis of calcaneal apophysitis, a typical description of (pain) com-
plaints was required; this consisted of the following: a growing child aged between 6 to 17 years, with uni or bilateral pain over the calcaneal apophyseal area (posteromedial and or lateral calcaneus). The pain is not caused by recent trauma. Absent are: erythema, swelling or other skin changes. Strict inclusion criteria were followed; patients were excluded in case of doubt. To assess whether patients met the inclusion criteria for the diagnosis of calcaneal apophysitis, all suspected cases of calcaneal apophysitis were independently assessed by one blinded researcher, one blinded GP and one blinded orthopedic surgeon specialized in pediatric orthopedics. To maintain the strict inclusion for incidence counts, cases were excluded in case of persisting interobserver differences regarding the final diagnoses of calcaneal apophysitis. A case was eligible to count for incidence rate if the first GP contact for these complaints was in the year 2010 or 2009 without a previous visit in 2009 or 2008. As no data for 2007 was obtained, scoring of incident cases rather than an appraisal was not possible for 2008.

RESULTS

All approached GPs gave consent for participation. All 34 practices combined had 16530 patients registered between the age 6 and 17 years. 16383 SOAP files were analysed. 16289 were excluded based on described criteria. The two researchers independently extracted 94 potential cases of calcaneal apophysitis. After further assessment by the blinded assessors 33 were excluded, resulting in the inclusion of 61 individual cases of pediatric patients with calcaneal apophysitis over the years 2010, 2009 and 2008 (Table 1). The weighted mean was calculated to determine the incidence rate over these years resulting in an overall incidence of 3.7 per 1000 persons. 46 out of the 61 cases of pediatric patients with calcaneal apophysitis were boys. The median age of the boys was 12 years old (range 9-15 years). The 15 girls included in this study had a median age of 10 years (range 8-12 years).

Table 1: Incidence calcaneal apophysitis per year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Pediatric patients with calcaneal apophysitis (total population age 6-17 years)</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008 (Appraisal)</td>
<td>18 (5720)</td>
<td>3.2</td>
</tr>
<tr>
<td>2009</td>
<td>17 (5474)</td>
<td>3.1</td>
</tr>
<tr>
<td>2010</td>
<td>26 (5336)</td>
<td>4.9</td>
</tr>
</tbody>
</table>
DISCUSSION

The purpose of this study was to analyse the incidence of calcaneal apophysitis in the Dutch general practitioner's (GP) practice. This study shows a weighted mean incidence of 3.7 per 1000 registered persons per year. To the authors' knowledge, this is the first study presenting incidence rates of calcaneal apophysitis in the Dutch GP population. Previous studies have elaborated on foot, ankle and non-specified heel pain in the GP population[1-4]. Some have calculated the percentage of patients with calcaneal apophysitis in their studied population[10]. Most of these reports provide information from (sports) medicine clinics or injury studies, resulting in an altered study population compared to the incidence of patients registered at a GP practice. This population bias, containing more active pediatric patients than the general GP population, leads to difficult interpretation of results and presumably high percentage of symptomatic pediatric patients.

Three years were evaluated to analyse the incidence of calcaneal apophysitis. As expected the first two years analysed had comparable results on patients with symptomatic calcaneal apophysitis. In 2008 this number was 18 out of 5720, resulting in a rate of 3.2 per 1000. In 2009 it was 17 out of 5474, a rate of 3.1 per 1000. However, in 2010 the number of patients with calcaneal apophysitis was remarkably higher: 26 out of 5336 resulting in 4.9 per 1000. It is unknown what causes the increase in incidence, it may be “pathology awareness” of the GP; it may be due to more awareness of patients/parents or more demanding patients/parents who expect a diagnosis from their GP. Finally it may be a coincidental finding that will not be repeated in forthcoming years. The incidence found in our study is relatively high compared to previous studies on heel pain[1-4]. This is especially the case as these studies did not focus on calcaneal apophysitis alone. As the incidence is higher than assumed the impact of this pathology on pediatric patients life becomes important. Scharfbillig et al reported on the quality of life (QoL) of patients with calcaneal apophysitis, he found a significant decrease in QoL in patients injured by this pathology[9]. This result, in combination with the current study, shows the importance of knowledge of this pathology and the treatment thereof. Hitherto, it is unsure which treatment is preferable; there are no high-level evidence study results[10]. The treatment seems to currently focus on heel raising inlays and sport cessation[7;10;12]. Based on this study it is obvious that more research should focus on calcaneal apophysitis. Compared to other pediatric heel and Achilles tendon pathologies there is a lack of research on calcaneal apophysitis. Although symptoms are often relatively mild it can lead to prolonged periods of casting, a decrease in quality of life and a forced early cessation of a youngster’s sports career[6;9;12]. Surrounding pathologies, for example Achilles tendinopathy and pes planus, are much more studied entities, even though the size of affected population is much smaller[1;2].
Due to the limitations of this study the actual incidence can only be higher than observed in this study. First, not everyone with pain complaints will visit a healthcare professional, hence a substantial group of patients will not see a doctor if complaints are sustainable. In a cross-sectional population-based study, Picavet et al reported that approximately 50% of the patients with musculoskeletal complaints visited a healthcare professional[8]. Second, most patients in the Dutch healthcare system visit their GP before being referred to a physiotherapist or medical specialist, however since 2006 patients can visit a physiotherapist or sports physician without GP referral. The incidence might therefore be higher if we were able to obtain information from these practices as well. Currently no systematic electronic file is used by these practices making it impossible to study the incidence of calcaneal apophysitis in multiple sports medical and physiotherapists’ practices. Finally, due to the strict inclusion criteria used in the selection of cases some less typical symptoms may have been missed in the selection process. This may have led to an underestimation of the size of the problem in this population.

Future studies regarding calcaneal apophysitis should foremost focus on the treatment of affected pediatric patients. As stated, only a few studies have focused on treatment and there is an absence of high level of evidence studies. In addition the focus should be on the underlying injury mechanism to analyse the pathophysiology of this injury. The cause of heel pain in these pediatric patients remains unknown.

In conclusion, this is the first study to study the incidence of calcaneal apophysitis in the general population. With an incidence of 3.7 in 1000 registered patients it is a common pathologic entity, which requires more research on pathophysiology and therapy.
REFERENCES