STRESS FRACTURES OF THE FEMORAL SHAFT IN MILITARY RECRUITS

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ABSTRACT

Stress fractures amongst military recruits are limited to the lower extremities; yet involvement of the shaft of the femur is unusual. Seven such cases in a series of 352 stress fractures are presented. The importance of early recognition and management is emphasized with a view to prevent bony disruption in an otherwise easily treatable condition.

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KEY WORDS : Fractures stress; Femoral fractures.

Introduction

Stress fractures occur in normal bones subjected to repeated submaximal unaccustomed stresses, any one of which would, in itself, be harmless [1,2]. Military recruits exposed to unaccustomed physical activity on initiation of training constitute the population at highest risk in the armed services. Despite exhaustive studies little has emerged regarding the aetiology and risk factors and stress fractures continue to be the single most important cause of lost training-time in military recruits.

Though stress fractures in recruits are limited to the lower extremities, involvement of femoral shaft is unusual. Early recognition and management not only prevent bony disruption but result in full recovery. The aim of this paper is to draw attention to stress fractures involving the shaft of the femur and to emphasize the importance of its early recognition.

Material and Methods

This study encompasses 352 stress fractures encountered in military recruits from 4 regimental training centres over a period of 7 years. All the recruits were able bodied men in the age group of 18-22 years.

Observations

Seven cases (2%) of stress fracture of the shaft

of femur were encountered. The recruits were physically fit, with a robust bony skeleton, coming from a rural agricultural background. Six reported during the period of basic training and 1 during trade-training, following completion of basic recruit training.

The left femur was involved in 6 cases and the right in only one. History of direct trauma was discounted in all cases. The presenting feature was an ill-defined pain in the knee on the affected side, coming on during physical activity especially long distance running, and relieved by rest. On an average symptoms had been present for 10-14 days before the recruits sought medical attention.

A detailed examination of the thigh on the affected side revealed an area of tenderness, better appreciated on the lateral aspect, corresponding to the area of localized periostitis on the radiogram (Fig 1). Two patients were admitted with complete fractures of the femoral shaft (Fig 2).

All patients were advised admission aimed at curtailing all physical activity and ensuring rest with a graduated return to full activity after 12 weeks. Of the 7, five recruits followed the advice and went on to successfully complete their training. Unfortunately the remaining 2, much against medical advice, returned to the training schedule after 15 days rest by which time the symptoms had completely disappeared; only to sustain a complete

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Fig. 1 : Stress fracture of the shaft of the femur presenting as a localized area of periostitis in the lower third.

disruption of the femur resulting in their invalidment out of service. This classically illustrates the result of neglect (Fig 2).

Discussion

The Prussian Oberstabartz (Colonel Doctor) Breithaupt in 1855 first described painful swellings of the feet in soldiers after long marches. Stechow in 1887 was the first to propose that the basic cause was repeated microtrauma [3]. Thereafter stress fractures were increasingly recognized as a problem exclusive to the Army. Later stress fractures were reported amongst athletes and have been described in practically every bone in all age groups. Ninety five per cent of them occurred in the lower extremities with the tibia being the commonest site, an observation confirmed universally [3-6].

Despite a large volume of work surprisingly little is known about the basic aetiology and risk factors. A few retrospective studies from USA did reveal a higher incidence in individuals leading sedentary existence prior to recruitment [2,7,8]. This is however contradicted by other studies

Fig. 2 : Neglected stress fracture of the shaft of the femur presenting as a complete comminuted fracture.

[4,9], and it is now accepted that there is no relationship between pre-training physical fitness and the incidence of stress fractures [4]. All the recruits we examined were healthy and fit individuals coming from an agricultural background given to regular physical activity with nothing to suggest a 'white collar existence' prior to recruitment. It is however well established that stress fractures occur 10-fold more frequently in females than in males [10]. Negroes, it has been observed, are much less prone to develop stress fractures [2].

Stress fractures commence as localized areas of cortical osteoporosis followed by endosteal and periosteal callus formation finally progressing to complete bone healing [11]. Provided the causative stress is curtailed early full recovery is the rule. If neglected, it could lead to complete bony disruption as in 2 of the cases presented in this study.

Stress fractures of the femoral shaft are uncommon; the incidence in most series varying from 0.8-2.8 per cent [2,3,7,11], except Giladi et al [4] who report an incidence of 29.9 per cent. In the present series an incidence of 2.0 per cent is

reported. Devas quotes most of these fractures as bilateral [12] : this is rather unusual as we did not see any such patient.

Pain referred to the knee (occasionally to the hip) related to activity is the commonest presentation [2,4,7,12]. Though reported in some series [4,12] it is unusual for the condition to be asymptomatic. It is emphasized that symptoms often mislead the clinician, and thus a high index of suspicion is required to entertain this diagnosis.

Based on the location of the lesion Provost and Morris [2] have suggested three more or less distinct groups, viz :

Group I : Linear oblique radiolucency in the medial cortex of the proximal shaft of the femur with associated periosteal reaction and sclerosis.

Group II : Displaced spiral oblique fractures of the mid shaft of the femur.

Group III : Transverse fractures of the distal third of the shaft of the femur with or without displacement.

It is suggested that Group II and III should also include a demonstrable periostitis or sclerosis only, with or without displacement. On including these criteria, there were 2 fractures in Group II and 5 in Group III in the present study.

The aim of management is prevention of bony disruption and displacement and it is achieved by curtailing physical activity. This is followed by a graduated return to activity after a period of 12 weeks, and a complete and uneventful healing of the fracture is assured. All the 5 patients managed in this manner recovered fully. In the 2 patients where the initial symptoms were neglected and the individuals lulled into a false sense of security, the

outcome was disastrous with comminuted fractures of the shaft of the femur, and the recruits were invalidated out of service.

This highlights the importance of early detection and management with a view to prevent complete fracture and bony displacement in an otherwise eminently treatable condition.

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