Gluteal Compartment Syndrome After Prolonged Immobilisation

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Muscles in the gluteal region are confined by distinct fascial attachments which can potentially result in compartment syndrome. A 74-year-old chronic drinker was admitted to the medical ward after being found drunk on the street. He noticed acute painful swelling of the right side of his buttock the following morning and recalled a slip and fall prior to his blackout. The whole right half of the buttock was tense with erythematous overlying skin. Examination revealed sciatic nerve palsy and myoglobinuria. Emergency fasciotomy and debridement were performed. Intra-operative pressure measurement confirmed a grossly elevated intra-compartmental pressure. Gluteal compartment syndrome is an extremely rare condition and has only been scantily documented previously in case reports. Early diagnosis is crucial but delay recognition is common from lack of knowledge of the condition and readily results in permanent sciatic nerve injury and acute renal shutdown from myoglobinuria. Awareness of the condition, early diagnosis and prompt exploration provide the only chance of avoiding these devastating consequences. Acute swelling diffusely affecting the whole or one side of the buttock, a history of trauma and prolonged local pressure impingement associated with pain out of proportion to the clinical signs should raise a suspicion of this rare condition. [Asian J Surg 2009;32(2):123–6]

Key Words: gluteal compartment syndrome, myoglobinuria, prolonged immobilisation, sciatic nerve palsy

Introduction

The significance of anatomy of the gluteal region is not often emphasised. In fact, muscles in the gluteal region are confined by distinct fascial attachments which can potentially result in life threatening compartment syndrome.

Case report

A 74-year-old chronic drinker sustained a slip-and-fall injury when he was drunk. He landed on his buttock and remained in a seated position for a few hours before he was brought to the emergency department.
urine. Examination further showed decreased motor power in the right lower limb with the power in the knee and ankle grade 3/5 and 0/5 respectively. The distal pulses remained strong. The clinical diagnosis was compartment syndrome of the right gluteal region complicated by rhabdomyolysis and sciatic nerve palsy. This was confirmed by the intracompartmental pressure reading of 36 mmHg with a needle manometer (Quick Pressure Monitor Set Ref 295-2, Stryker) inserted into the right gluteus maximus muscle.

Emergency exploration was therefore undertaken. A long curvilinear incision was made from iliac crest to proximal thigh (Figure 4). The fasciae of the gluteus muscles were incised and the underlying muscles were examined for viability. Extensive debridement was not necessary in this case. The wound was partially closed on both ends leaving the central part open.

Postoperatively the patient remained anuric and required haemodialysis for 10 days. Nerve conduction study showed severe right sciatic nerve degeneration. He eventually became wheelchair bound despite vigorous rehabilitation exercises.
Discussion

It is postulated that prolonged local pressure on the gluteal muscles from lying on hard uneven ground in an unaccustomed position was the cause of muscle injury in this patient (Table 1). Consequent muscle cell damage and oedema within the unyielding fascia resulted in vascular compromise and further swelling, and thus a vicious cycle developed. The gluteal muscles are confined within three distinct compartments which include the gluteus maximus compartment, the compartment of gluteus medius and

Table 2. Case reports on gluteal compartment syndrome (in the order of year of publication)

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Cause(s) of compartment syndrome</th>
<th>Documented compartmental pressure of the gluteal muscles</th>
<th>Presence of active bleeding vessel(s)</th>
<th>Sciatic nerve palsy</th>
<th>Rhabdomyolysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evanski PM et al¹</td>
<td>1977</td>
<td>Direct trauma</td>
<td>Not documented</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Owen CA et al²</td>
<td>1978</td>
<td>Direct trauma, prolonged immobilisation</td>
<td>30, 32, 40 mmHg</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Petrik ME et al³</td>
<td>1988</td>
<td>Direct trauma</td>
<td>40, 55 mmHg</td>
<td>No</td>
<td>Yes</td>
<td>Not documented</td>
</tr>
<tr>
<td>Schmalzried TP et al⁴</td>
<td>1992</td>
<td>Prolonged immobilisation</td>
<td>30, 35, 110 mmHg</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Yoshioka H⁵</td>
<td>1992</td>
<td>Direct trauma, prolonged immobilisation</td>
<td>35 to 74 mmHg</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Hynes JE et al⁶</td>
<td>1994</td>
<td>Prolonged immobilisation</td>
<td>Not documented</td>
<td>Not documented</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bleicher RJ et al⁷</td>
<td>1997</td>
<td>Suspected prolonged immobilisation</td>
<td>103 and 135 mmHg</td>
<td>No</td>
<td>Not documented</td>
<td>Yes</td>
</tr>
<tr>
<td>Pacheco RJ et al⁸</td>
<td>2001</td>
<td>After orthopaedic operation</td>
<td>Not documented</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Krysa J et al⁹</td>
<td>2002</td>
<td>After orthopaedic operation</td>
<td>58 mmHg</td>
<td>No</td>
<td>No</td>
<td>Not documented</td>
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<tr>
<td>Roth JS et al¹⁰</td>
<td>2002</td>
<td>After bone marrow aspiration</td>
<td>Not documented</td>
<td>No</td>
<td>Yes</td>
<td>Not documented</td>
</tr>
<tr>
<td>Su WT et al¹¹</td>
<td>2004</td>
<td>After vascular operation</td>
<td>Not documented</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>David V et al¹²</td>
<td>2005</td>
<td>Direct trauma</td>
<td>Not documented</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pua BB et al¹³</td>
<td>2005</td>
<td>After vascular operation</td>
<td>72, 80, 123, 150 mmHg</td>
<td>No</td>
<td>Yes</td>
<td>Not documented</td>
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<tr>
<td>Somayaji HS et al¹⁴</td>
<td>2005</td>
<td>After orthopaedic operation</td>
<td>Not documented</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Hayden G et al¹⁵</td>
<td>2006</td>
<td>Direct trauma</td>
<td>Not documented</td>
<td>Right internal iliac artery</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
minimus muscles and the tensor fascia lata compartment. This was confirmed by David V et al through injection of radiopaque contrast media in a cadaveric study.\(^1\)\(^2\)

The gluteal compartment syndrome (GCS) is not well documented in surgical textbooks but has been reported previously (Table 2). Orthopaedic operation is the most commonly described cause of GCS. Prolonged immobilisation, usually during a state of unconsciousness, is also a very common cause. Direct trauma leading to primary gluteal muscles injury has also been documented as a cause of GCS.

GCS presents with acute painful swelling of the gluteal region, frequently associated with sciatic nerve palsy and rhabdomyolysis (Table 2). Misdiagnosis as buttock abscess or deep vein thrombosis is common and can lead to delay in management.\(^6\)

Difficulty in making an early diagnosis is due to the fact that overt signs like sciatic nerve compression and myoglobinuria from rhabdomyolysis only occur at a late stage of the disease. Failure to appreciate this condition may also be a hindrance as GCS is so rarely documented.

Making an early diagnosis depends upon a high index of suspicion. Measurement of the intracompartimental pressure is usually confirmatory of the diagnosis. An imaging study is not strictly necessary for diagnosis, unless the history is suggestive of vessels injury. In the latter case, a CT scan with contrast or an angiogram may be used to identify bleeding vessels with a view to embolisation. Most case reports recommend fasciotomy when the compartmental pressure is greater than 30 mmHg which is the upper limit of capillary pressure.\(^16\)\(^17\) However, a borderline reading should not warrant any delay in emergency exploration when the condition is suspected clinically or biochemically.

**Conclusion**

GCS is an extremely rare condition documented previously only in isolated case reports. Early diagnosis is crucial but a delay in recognition is common from a lack of knowledge of the condition and readily results in permanent sciatic nerve injury and acute renal shutdown from myoglobinuria. Awareness of the condition, early diagnosis and prompt exploration provide the only chance of avoiding these devastating consequences.

Acute swelling diffusely affecting the whole or one side of the buttock, a history of trauma and prolonged local pressure impingement associated with pain out of proportion to the clinical signs should raise a suspicion of this rare condition.

**References**