



INTERNATIONAL JOURNAL OF CLINICAL SKILLS



A Peer Reviewed International Journal for the Advancement of Clinical Skills
- *'docendo ac discendo' - 'by teaching and learning'*



In this issue:

When are bowel sounds most reliable in the diagnosis of small bowel obstruction?

Teaching professionalism in the medical program

A reliable way to clinically assess for compartment syndrome in the leg

Foreword

Welcome to the latest edition of the International Journal of Clinical Skills (IJOCS), Volume 6, Issue 1, November 2012.

A research group in Saskatchewan, Canada discuss whether bowel sounds are reliable in the diagnosis of small bowel obstruction. Their evidence suggests that the auscultation of bowel sounds alone does not appear to be reliable in diagnosing this condition, presenting some interesting research data. Their work emphasizes one of the most important aspects of medical diagnosis – that 'each physical sign is only a portion of the bigger picture'.

Some of our educational colleagues in Melbourne, Australia have conducted research regarding some of the most fundamental issues in medical practice: professionalism and ethics. They have focused on enhancing the understanding of current teachings of professionalism and ethics. Their research will no doubt aid better preparation of future graduates for a truly ethical and professionally rewarding career.

Mr Alun Yewlett and his orthopaedic team, Swansea, United Kingdom, discuss compartment syndrome – a clinical diagnosis which causes significant morbidity if not recognised and treated promptly. The authors present a clinical method for helping clinicians diagnose this potentially limb and life threatening condition. Could this be a significantly reliable method to allow an evolving compartment syndrome to be recognised early in its natural history?

This issue also includes a review of Alasdair K. B. Ruthven's book 'Essential Examination'. The aim of this book is to provide easy access to the key points of clinical examination for senior medical students and junior doctors. Professor Jean Ker (Professor of Medical Education, University of Dundee, Scotland) gives her expert analysis of what the book provides for its readers.

As always, your feedback is invaluable for the continued development of the International Journal of Clinical Skills – the only peer reviewed international journal devoted to clinical skills (e-mail: feedback@ijocs.org).

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A reliable way to clinically assess for compartment syndrome in the leg

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Tibial fracture

Abstract

Compartment syndrome is a clinical diagnosis that causes significant morbidity if not recognised and treated promptly. We present a clinical method to assess for compartment syndrome in the leg that we believe is reliable and allows an evolving compartment syndrome to be recognised early in its natural history.

Introduction

Compartment syndrome is a potentially limb threatening complication of high energy tibial fractures [1]. Rapid diagnosis and immediate fasciotomy are essential to prevent disability [2, 3]. The diagnosis should be suspected from the mechanism of injury and the severity of the patient's pain. Progressively worsening pain in a limb that has been appropriately treated with immobilisation and appropriate analgesia, is described as being 'out of proportion' to that expected.

Why is compartment syndrome so important to recognise?

Untreated compartment syndrome can lead to significant morbidity and even death [4, 5]. This occurs because an increase in pressure in a closed fascial compartment results in microvascular compromise that leads to muscle ischaemia. This ischaemia leads to impaired myoneural function and necrosis of the soft tissue. This in turn can precipitate the release of toxic metabolites into the circulation that can precipitate potentially fatal arrhythmias.

Pathophysiology

In compartment syndrome the pressure within the compartment is elevated above normal physiological levels (approximately 4 – 8 mmHg). This increase in pressure prevents venous outflow from the compartment first as this is the lowest pressure system. As the venous blood remains trapped, the pressure in the compartment continues to rise as the arterial inflow is of a high enough pressure to continue to drive blood into the system. As the intra-compartmental pressure rises, the blood supply to the different branches of the circulatory system in the affected compartment are occluded in a stepwise fashion from the lowest pressure system to the highest. The order of occlusion therefore will be veins, venules, capillaries, arterioles and arteries. This explains why the absence of a pulse is a late sign in compartment syndrome. Due to the fact that tissue perfusion occurs primarily at the capillary level, irreversible damage may have already occurred by the time that the pulses are absent, and therefore compartment syndrome should be suspected before this sign is present.

Clinical assessment

A reliable sign seen in a developing compartment syndrome is altered sensation in the distribution of the nerves that run through the affected compartment. In the leg, the anterior compartment appears particularly vulnerable to compartment syndrome, a characteristic which may relate to the nature of its blood supply [6]. The deep peroneal nerve (DPN) runs through this compartment and rising intra-compartment pressure results in ischaemic neurapraxia, which may be detected as altered sensation in the cutaneous innervation of this nerve, in the dorsal skin over the first-web space of the foot.

Unless the compartment syndrome is floridly manifest, repeated examination at short intervals is recommended. When applied consistently, the method described can be used to compare findings at one time point with another to detect any deterioration, even if the signs are elicited by different examiners. To test for any altered sensation in this territory the examiner should gently stroke both feet in the first-web space simultaneously with a finger (Figure 1) and the patient should concurrently be asked, “do both sides feel the same or different?” The phrasing of the question to the patient is critical. In this way the patient is more likely to give useful information to the examiner. Do not ask “can you feel this?” whilst stroking the skin, as a dermatome that is becoming numb may still be sensate enough for the patient to feel the stimulus and they may only answer “yes” or “no” to the question and not realise that the quality of the sensation is important.

Figure 1: Bilateral simultaneous testing of the first-dorsal web space of the feet



The presence of any altered sensation with an appropriate clinical history should alert the examiner to the possibility of a developing compartment syndrome and consequently the need to urgently alert an orthopaedic specialist to review the patient as an emergency. If the patient's pain is then exacerbated by passively

stretching the muscles that run through the affected compartment, then the clinical diagnosis of compartment syndrome is confirmed.

The authors appreciate that there are a number of circumstances where there may be differences in sensation between both sides being examined, for example, in the presence of pre-existing nerve damage. However, we argue that due to the importance of positively making an early diagnosis of compartment syndrome and the catastrophic results of delayed diagnosis, that ‘over-referring’ for a specialist opinion in such cases is better than ‘under-referring’.

Conclusion

A missed compartment syndrome can lead to devastating consequences that can be both life and limb threatening – therefore prompt diagnosis is crucial. We describe a clinical method that does not require any specialist equipment, to aid clinicians in making this diagnosis. When applied consistently, this method can be used to compare findings at one time point, with another, to detect any deterioration even if the signs are elicited by different examiners.

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