Cold Case Files: 15 years on, did patient controlled analgesia mask acute compartment syndrome?

Dear Editor,

The use of analgesic techniques has been implicated in masking the diagnosis of acute compartment syndrome (ACS).\(^1\) Such a case report was published in this journal in 2002\(^2\). The authors suggested that pain relief associated with using morphine patient-controlled analgesia (PCA) prevented early diagnosis of ACS of the leg with subsequent below knee amputation. Recently a review of all reported cases of analgesia-implicated delayed diagnosis, found that symptoms/signs of developing ACS are often ignored or there is inadequate knowledge of the characteristics of analgesic techniques\(^3\). This review prompted us to reinvestigate the 2002 case by interviewing the patient involved and reviewing the medical notes.

In this case, a 21-year-old male suffered a closed displaced fracture of his right tibia during a soccer match and had intramedullary tibial nailing the following morning. He was prescribed a PCA infusion postoperatively as previously reported\(^2\). We found that the patient complained of persistent loss of sensation in his toes 26 hours earlier than previously reported and that inability to dorsiflex the great toe occurred 8 hours prior to diagnosis of ACS. These symptoms were documented on assessment by the Orthopaedic team at 7 and 18 hours postoperatively but their significance was not realised until his foot was noted to be pale, numb and cold. Despite fasciotomies and further surgeries a below knee amputation was required. Interestingly the patient recalls a “constant pressure in my leg” following surgery which was not recorded.

Our review of this case 15 years later found an over-reliance on the symptom of excessive pain to diagnose ACS. The traditional “6 P’s” of clinical diagnosis include paraesthesia which has a similar predictive value as pain\(^4\). This new onset neurological symptom could have alerted one to the possibility of ACS. Similarly the paralysis of the great toe suggested a worsening ACS. Nevertheless relying on clinical signs alone to diagnose ACS is flawed. Cases of “silent” compartment syndrome have been reported\(^1\). Intra-compartmental pressure monitoring, which was not used in this patient, allows for early diagnosis of ACS, but may result in unnecessary fasciotomies\(^4\). Near Infra-Red Spectroscopy (NIRS) use has been reported in the orthopaedic literature but appears to be underutilized\(^4\). The aim of this cold case review was to improve our understanding of the relationship between postoperative pain, analgesia and ACS. Cases such as this continue to be referenced and inform current clinical practices despite changes occurring in patient care since publication\(^1,3\).

Patients who are in pain require effective pain relief. Modern PCA use is monitored with regard to pain scores, opioid used and requests made. Regional anaesthesia infusions use dilute local anaesthetic
concentrations allowing breakthrough pain from a developing ACS\(^1\).

The management of patients at risk of ACS requires greater education, a system of careful surveillance, advanced monitoring, and an understanding of the nuances of this potentially devastating condition. Our review suggests (with the benefit of hindsight) that the compartment syndrome could have been diagnosed earlier despite the use of PCA and reported absence of pain.

S Mannion\(^1\), P Lee\(^2\), C Taylor\(^3\).

\(^1\)Consultant Anaesthetist, Department of Anaesthesiology, South Infirmary Victoria University Hospital, Cork, Ireland.

\(^2\)Consultant Anaesthetist, Department of Anaesthesia & Intensive Care, Cork University Hospital, Cork, Ireland.

\(^3\)Consultant Orthopaedic & Trauma Surgeon, Department of Orthopaedics and Trauma, Cork University Hospital & South Infirmary Victoria University Hospital, Cork, Ireland.

Correspondence:
Stephen Mannion, Consultant Anaesthetist, Department of Anaesthesiology, South Infirmary Victoria University Hospital, Cork, Ireland.
Email: Mannion.Stephen@sivuh.ie

References