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INTRA-ABDOMINAL ORGAN DYSFUNCTION FROM PRONE POSITION PAEDIATRIC SPINAL SURGERY: A SINGLE-CENTRE STUDY

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Introduction

Intra-abdominal organ dysfunction from prone position paediatric spinal surgery has been cited in case reports (1), however larger studies evaluating the incidence are lacking. Our institution (Royal National Orthopaedic Hospital) is one of the leading centres internationally for corrective scoliosis surgery. Therefore, given our large case numbers, we undertook this study to identify the incidence and severity of intra-abdominal organ dysfunction following prone position paediatric spinal surgery.

Methods

Paediatric patients undergoing corrective scoliosis surgery in the prone position were identified prospectively from theatre booking records. Following patient discharge, a notes review was conducted to collect data on demographics, intraoperative details, and postoperative complications. The study recruitment period was 2 months (Dec 21 – Jan 22), and 53 patients were included in this analysis.

Results

The mean age was 14 years (range 4 to 19 years). The majority (41) had adolescent idiopathic scoliosis, with the remaining 12 children suffering from an underlying neuro-muscular condition.

Renal:

Three patients developed stage 1 acute kidney injury postoperatively, giving an incidence of 5.7%. The mean creatinine rise was from 60umol.L at baseline to 98umol.L at peak. All cases occurred within the first 24 hours after surgery, and successfully resolved with conservative treatment. In one patient, the renal impairment was caused by rhabdomyolysis, with creatinine kinase peaking at 20,247U.L. Rhabdomyolysis has been reported as a complication from prone position spinal surgery, with a potential mechanism being large abdominal vessel compression leading to lower limb muscle ischaemia (2).

Hepatic:

Twelve patients developed liver dysfunction, with postoperative hepatic transaminitis, resulting in an incidence of 23%. The mean rise in alanine transaminase (ALT) was from a baseline of 20U.L to 80U.L on postoperative day 1, and peaking at 104U.L. No patients developed jaundice or encephalopathy. Seven patients had abnormal coagulation results (incidence 13%), with a mean rise in INR from a

baseline of 1.07 to 1.34 postoperatively. There were no associated bleeding complications, and all patients' liver function tests normalised with conservative measures.

Conclusion

This study demonstrates a high incidence of renal and hepatic dysfunction following prone position corrective scoliosis surgery in the paediatric population. It is unclear if prolonged prone positioning is the main causative factor. Possible mechanisms that have been hypothesised include this position causing intra-abdominal hypertension (3) leading to compromised organ perfusion, or it restricting ventricular filling through anterior sternal compression and thus reducing cardiac output to abdominal viscera (1). All our paediatric scoliosis surgery patients are managed on a high dependence unit for at least 24 hours after surgery. This may have been an important factor in facilitating early recognition and management of these complications and thus ensuring the severity in all cases was low.

References

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