Management of life-threatening blunt head trauma in childhood—A case report

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A R T I C L E   I N F O

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A B S T R A C T

INTRODUCTION: Traumatic head/brain injury (TBI) is a leading cause of death and life-long disability in children. The key to successful management of extradural haematoma is early recognition and evacuation.

PRESENTATION OF CASE: We report the successful management of a child with life-threatening traumatic brain injury requiring timely surgical intervention outside of a specialist neurosurgical unit.

DISCUSSION: Children with an operable injury have improved outcomes if their lesion is surgically evacuated within four hours. This can be challenging in regions located a significant distance from paediatric neurosurgical specialist centres.

CONCLUSION: This case supports the recommendation for general surgeons maintaining the skill of burrhole evacuation of extradural haematomas. Whether this will remain feasible in the era of “super-specialisation” is questionable.

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1. Case

A four year old girl fell from the top of a 5-m high water-slide, striking her right temple on a tiled floor. There was no immediate loss of consciousness and initial examination at the scene revealed that her pupils were equal and reactive to light and she was moving all four limbs. Five minutes after the fall she vomited and became drowsy and pale. She was transferred to the accident and emergency (A&E) department by ambulance.

On arrival at A&E her heart rate was 48 beats/min and blood pressure was 150/90 mm Hg. The Glasgow Coma Scale was 5/15 and the right pupil was fixed and dilated to 7 mm in diameter. The patient was intubated with cervical spine immobilization and the neurosurgical team on call in the appropriate tertiary referral centre were consulted.

Following intravenous administration of 100 mL of Mannitol, arrangements were made for emergency burrhole exploration. Computed tomography (CT) of the brain was deferred as advised by the neurosurgical team.

The patient was transferred to the operating theatre 30 min after arrival at the hospital. An incision in the right temporal region revealed a skull fracture. Fragments of bone were removed from the fracture site using bone nibblers. A large extradural haematoma (EDH) was evacuated. Haemorrhage from the middle meningeal artery was controlled with diathermy. The craniotomy was left open and covered with a sterile dressing. The right pupil had returned to normal size and was reacting to light at the end of the procedure. The patient was then transferred by ambulance to the neurological unit a distance of 250 km away. A CT brain performed following transfer revealed no new haemorrhage and no evidence of midline shift. The patient made an uncomplicated complete recovery with no neurological deficits.

2. Discussion

The key to successful management of EDH is early recognition and haematoma evacuation. 1 Patients with an operable injury have improved outcomes if their lesion is surgically evacuated within 4 h. 2 Paediatric neurosurgical services in Ireland are centralized to Dublin; in cases where there is a defined window (4–h) in which intervention will improve outcomes, the system-of-care must contend with the issue of patient access to services and transfer of critically ill patients. It is recommended that the “transfer of a child to a specialist neurosurgical unit should be undertaken by an experienced (regional) paediatric transfer team”. 3, 4 UK audits of emergency access to specialist neurosurgical services for paediatric TBI reported that in over 50% of cases requiring emergency haematoma evacuation, it was not possible to achieve transfer to a neurological centre within 4 h of presentation. 5 Furthermore, median transfer times were significantly longer when the patients were transferred by a “regional specialist team”. It is postulated that the guideline of 4-h to emergency surgery in these cases is unworkable in regions covering road distance travel times of greater than 45 min. 6

With a single paediatric neurosurgical unit in Ireland, this represents a considerable challenge. Potential solutions including improvements in aero-medical transfer times, and the introduction of telesurgery facilities are economically demanding and will take time to implement. In the interim, it is important that critically ill patients with TBI are managed appropriately. Reports from geographically remote regions in Australia and New
Zealand indicate that general surgeons undertake emergency neurosurgical procedures with acceptable outcomes7,8 and it has been recommended that surgeons working in general hospitals be familiar with emergency burrhole evacuation and the indications for surgery in TBI.9 An excellent functional outcome was achieved for this patient following emergency craniotomy in a hospital without specialist neurosurgical facilities. The severity of the injury combined with travel time to the nearest neurosurgical unit mandated immediate, definitive intervention locally before transfer. The neurosurgical team contacted were at all times fully informed of the patient’s progress and consulted on management decisions. The operating surgeon was familiar with the operation required and emergent craniotomy was successfully undertaken as recommended by the neurosurgical team consulted.

3. Conclusion

This case supports the recommendation for general surgeons maintaining the skill of burrhole evacuation of EDH, however whether this will remain feasible in the era of “super-specialisation” is questionable.

Conflict of interest

None.

Funding

None.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Aoife J. Lowery – Data collection & preparation of manuscript; Waqar Khan – contributed to preparation of manuscript; Kevin Barry – concept for case report and review of manuscript.

References