

Unearthing Neglect and Safeguarding Issues in an Infant With Spina Bifida

Amanda Fenech, Mariella Mangion

Background: An infant with spina bifida and a ventriculoperitoneal (VP) shunt presented with swelling over the shunt. Initial investigations revealed a depressed occipital fracture and a small subdural haemorrhage, raising concerns about potential non-accidental injury (NAI) due to inconsistencies in the parents' account of the injury. A thorough literature review was done, however, there is paucity of literature on NAI in children with spina bifida.

Clinical findings: Local protocols for investigating NAI and abusive head trauma (AHT) were followed, uncovering a metaphyseal fracture of the left femur and an old proximal right tibial fracture. The infant had missed several follow-up appointments. During the hospital stay, the mother's poor interaction and inability to provide basic care were noted, evidenced by an incident where the infant sustained a lacerated wound to the ear secondary to inappropriate garment choice and rough handling.

Conclusion: In this case, NAI was eventually excluded but there remained significant concerns about physical neglect, emotional neglect, and medical neglect. In view of these significant concerns, a Care Order was later issued for this infant. Although this case was not an NAI case, it demonstrated the subtle but serious nature of neglect, particularly in children with medical conditions like spina bifida, where clinical findings might be misattributed to the condition rather than parental neglect.

Dr Amanda Fenech
MD, MSc, RCPCH(UK)

Department of Child and Adolescent
Health,
Mater Dei Hospital,
Msida, Malta

<https://orcid.org/0000-0002-0471-1315>

Dr Mariella Mangion
MD, MSc Public Health, MRCP(UK)

Department of Child and Adolescent
Health,
Mater Dei Hospital,
Msida, Malta

Spina bifida encompasses a range of congenital malformations involving the failure of neural tube fusion, categorized into four types: occulta, closed neural tube defects, meningocele, and myelomeningocele.¹ The prevalence varies geographically and ethnically, with rates between 1.0 to 10.0 per 1000 live births.²

Individuals with spina bifida frequently experience osteoporosis and an increased risk of fractures. Fracture rates in children, adolescents, and adults are 10.9/1000, 5.4/1000, and 2.9/1000 patient years, respectively.³ Childhood fractures often involve the distal femur and femoral shaft, with the median age of first fracture at 7 years. Radiographic features in these patients include an absence of a fracture line, hypertrophic periosteal reaction, and sclerosis at the fracture site.⁴ Clinically, fractures in these children may present without pain, swelling, or displacement of bone fragments, attributed to osteoporosis from reduced motor activity, decreased axial load, immobilization post-surgery, suboptimal growth, and poor nutrition.⁴

There is a lack of literature on non-accidental injury presentations in children with spina bifida. This case, involving a child with spina bifida, osteoporosis, and absent pain syndrome, was investigated for potential neglect, ultimately leading to a Care Order under Section 31 of the Children Act 1989 due to significant harm and inadequate parental care.

CASE DESCRIPTION

Patient Information

Jane (fictional name), a 6-month-old girl with myelomeningocele, Chiari Type 2 malformation, hydrocephalus, and a left-sided ventriculo-peritoneal (VP) shunt, was born via C-section at 39+2 weeks to non-consanguineous parents. Post-birth, she underwent multiple surgeries for her conditions and was discharged at 4 months to live with her parents and two-year-old sister. At a regular orthopedic appointment for left hip developmental dysplasia, she presented with a head tilt, temporal swelling, irritability, and vomiting. She was referred to the paediatric emergency department (PED) directly by the outpatient orthopaedic doctor, where a CT brain was done and a comminuted depressed fracture of the occipital bone, accompanied by a small subdural haemorrhage was reported. She was admitted under

joint neuro-surgical and paediatric care for neuro charting and further investigations.

Clinical and Diagnostic Findings

History provided by Jane's mother was that two days prior, while doing physiotherapy exercises, Jane jerked back and fell head first onto the carpeted floor. Jane did not cry and seemed comfortable, so the parents did not seek medical advice. On physical examination by the safeguarding paediatrician, it was noted that she was small for her age. Despite being reported to have been feeding well, she was failing to thrive. Her birth weight was 4.23 kg (p98), on discharge at 4 months, her weight was 5.55 kg (p9-25) and on admission at 6 months of age, her weight was 5.62 kg (p2). Her sclerae were white and there were no rachitic rosary or wrist swelling. There was no family history of fractures or metabolic bone disease of note. There was a yellowish bruise over the left parietal area, around 4cm in diameter, a 1cm diameter bruise over the left elbow and a fading, 2cm x 1cm bruise over her right thigh. Her anterior fontanelle was soft and not bulging.

Blood investigations including a full blood count, renal profile, calcium, phosphate, magnesium, albumin, thyroid profile, parathyroid hormone, vitamin D, iron profile, folate, ferritin and Vitamin B12 levels were carried out. These showed a leukocytosis of $14.66 \times 10^9/L$ and a microcytic anaemia with haemoglobin of 8.7 g/dl and a mean cell volume of 73.1 fL. Folate (54 nmol/L), Vitamin B12, ferritin and iron profile were normal, implying chronic anaemia. She had a thrombocytosis of $625 \times 10^9/L$; CRP of 20.2 mg/L; Vitamin D level of 52 (normal); elevated calcium (2.65 mmol/L), normal phosphate (1.54 mmol/L) and normal coagulation profile, renal profile, thyroid profile, albumin and parathyroid hormone. The CT brain reported a comminuted depressed fracture of the occipital bone with maximum 6mm depression, accompanied with a small (5mm) subdural haemorrhage ([Figure 1](#)). An ophthalmic review was carried out and excluded retinal haemorrhages and papilloedema. Magnetic Resonance (MR) brain imaging was also carried out to exclude shearing injuries and subdural haemorrhages. The MR brain reported a small but increased amount of fluid surrounding the VP shunt tubing over the left parietal region but with preserved extra-axial spaces. A normally progressing cerebral myelination pattern was noted with cerebellar tonsillar ectopia (which was



Figure 1 CT scan of the brain showing a depressed comminuted fracture and a small subdural haemorrhage. One can also note the enlarged ventricles and subcutaneous haematoma over the left parietal area.

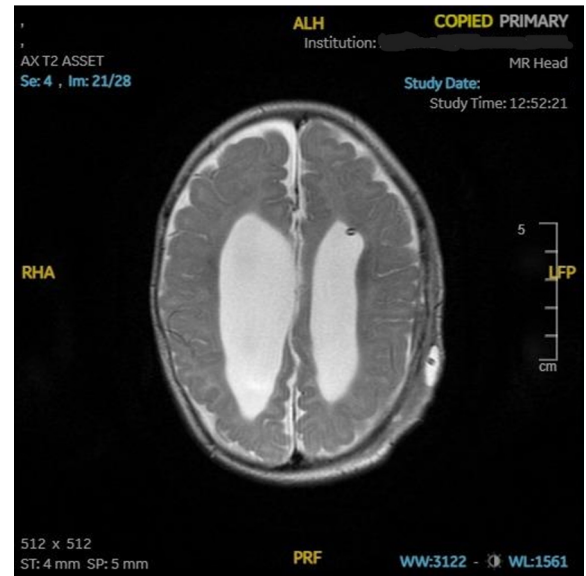


Figure 2 Magnetic Resonance Imaging of the brain showing a recent skull fracture with residual subcutaneous hematoma over the parietal area. There is no restricted diffusion to suggest a shearing injury.

noted on previous MRIs). There was no restricted diffusion to suggest a shearing injury and no significant hemosiderin deposition on SWI to suggest diffuse axonal injury (Figure 2). However, the skeletal survey reported a metaphyseal fracture of the left femur (Figure 3). An MRI of the right lower leg revealed an abnormality in the right proximal tibia, with mild marrow and periosteal signal changes. Initial findings were indeterminate due to the absence of an oedema pattern. A follow-up X-ray four weeks later showed bony changes indicative of a healing proximal tibial fracture with complete radiological union (Figure 4).

Therapeutic Interventions

Jane was managed with regular analgesics and monitored by the neurosurgical team, confirming her shunt was functioning. She was discharged with follow-up appointments with her consultants and the orthopedic and neurosurgical teams.

FOLLOW-UP AND OUTCOMES

Due to the combination of cranial and lower limb findings, non-accidental injury (NAI) was suspected. Despite consistent accounts from the parents, police involvement, and close monitoring by social workers, further evidence of neglect emerged, including multiple missed appointments, re-presentation at

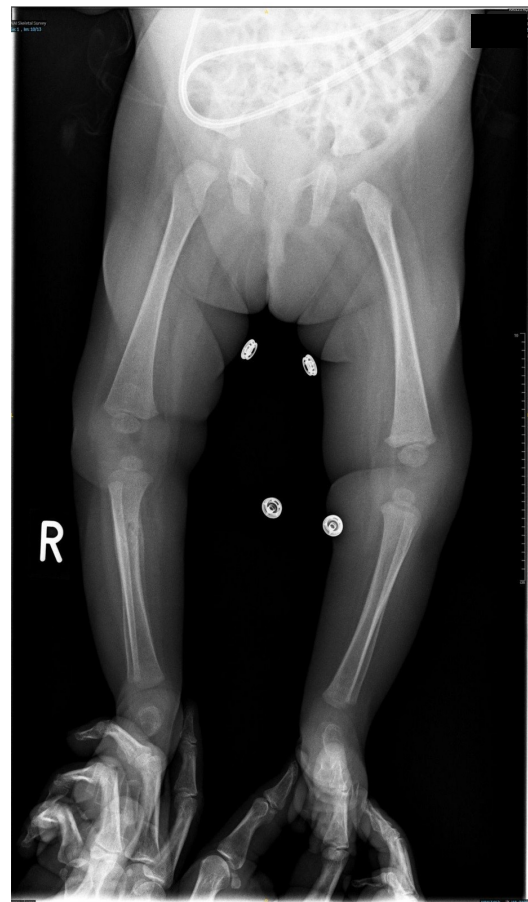


Figure 3 Skeletal survey showing a lesion in the right tibia



Figure 4 Plain XR of the right lower leg showing the presence of the bony changes with in-filling of the lucent zone and a reduction in the smooth periosteal reaction, suggesting a healing proximal tibial fracture, now showing complete radiological union.

the PED two weeks after discharge with a 7cm long post-auricular lacero-contused wound behind her ear following rough undressing and inadequate parental engagement noted by nurses in the wards and by the social workers at home. Jane was eventually taken into residential care under a Care Order, showing significant developmental and mental improvement, highlighting prior neglect.

DISCUSSION

Skull fractures in children, especially those involving the occipital bone, are significant due to their association with intracranial injury, a leading cause of traumatic death in childhood.⁵ Falls are common in children under two, and depressed fractures often result from localized external force.^{6,7} Abusive head trauma is predicted by specific variables such as respiratory compromise, bruising, and certain types of skull fractures, carrying substantial morbidity and mortality.⁸

In Jane's case, the depressed occipital fracture, along with other findings, initially suggested abusive head trauma but later investigations pointed to significant neglect. The increased weight of her head due to hydrocephalus and poor head control likely worsened the outcome of a fall. The lower limb fractures and a laceration raised concerns of rough handling. Osteoporosis and sensory deficits in spina bifida patients delay fracture diagnosis, with clinical signs often absent.⁴

The case emphasises the need for thorough safeguarding evaluations in children with spina bifida. Neglect can manifest in subtle ways, and multidisciplinary teams must be vigilant in identifying and addressing these issues to prevent harm and ensure the child's well-being.

REFERENCES

1. National Institute of Neurological Disorders and Stroke. Spina bifida. Published 2023. Accessed June 23, 2026. <https://www.ninds.nih.gov/health-information/disorders/spina-bifida>
2. Au KS, Ashley-Koch A, Northrup H. Epidemiologic and genetic aspects of spina bifida and other neural tube defects. *Dev Disabil Res Rev*. 2010;16:(1)6.
3. Trinh A, Wong P, Brown J, et al. Fractures in spina bifida from childhood to young adulthood. *Osteoporos Int*. 2017;28:(1)399-406.
4. Ivanov SV, Kenis VM, et al. Fractures of lower limbs in children with spina bifida. *Pediatr Traumatol Orthop Reconstr Surg*. 2018;6:(3)25-31.
5. Schutzman SA, Greenes DS. Pediatric minor head trauma. *Ann Emerg Med*. 2001;37:(1)65-74.
6. Powell EC, Atabaki SM, Wootton-Gorges S, et al. Isolated linear skull fractures in children with blunt head trauma. *Pediatrics*. 2015;135:(4)e851-7.
7. Araki T, Yokota H, Morita A. Pediatric traumatic brain injury: characteristic features, diagnosis, and management. *Neurol Med Chir (Tokyo)*. 2017;57:(2)82.
8. Joyce T, Gossman W, Huecker MR. Pediatric abusive head trauma. *StatPearls*. Published 2023. Accessed June 23, 2026. <https://www.ncbi.nlm.nih.gov/books/NBK499836/>