Sri Lanka Journal of Forensic Medicine, Science & Law — June 2026;17(Special Issue):29-32
DOI: https://doi.org/10.4038/sljfmsl.v17i5.8073

CASE REPORT

PAEDIATRIC INFECTIVE ENDOCARDITIS PRESENTING AS INTRACRANIAL HAEMORRHAGE: A MEDICO-LEGAL DIAGNOSTIC CHALLENGE

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ABSTRACT

Introduction: Intracerebral haemorrhage (ICH) and subarachnoid haemorrhage (SAH) in children represent diagnostic and medicolegal dilemmas, because more often than not, there is no history of trauma. Non-accidental injury (NAI)/ suspected physical abuse is often suspected in such cases, yet natural causes must not be ruled out completely. Infective endocarditis (IE), though rare in children, can lead to septic embolization and vascular rupture resulting in ICH and SAH, often mimicking traumatic head injury.

Case Presentation: This case study represents a ten-year-old girl who was admitted to a local hospital with loss of consciousness following a brief febrile illness. She was immediately transferred to the nearest tertiary care unit (National Hospital of Sri Lanka/ NHSL), and neuroimaging revealed right frontal ICH with SAH extension. Subsequent investigations demonstrated methicillin-sensitive Staphylococcus aureus (MSSA) bacteraemia and echocardiographic vegetations on the mitral valve, confirming IE. The child was treated with intravenous antibiotics and supportive care, and she eventually made a full recovery.

Conclusion: This case highlights the challenges in distinguishing natural from inflicted/traumatic paediatric haemorrhages and highlights the diagnostic value of multidisciplinary collaboration among forensic, paediatric, microbiology, and cardiology teams. Paediatric IE is rare because valvular endocardial damage and sustained bacteraemia seldom occur in healthy children; however, when it does, it usually involves a highly virulent organism or pre-existing cardiac anomalies. Awareness of this presentation prevents misinterpretation of infection-related brain bleed as child abuse, ensuring accurate medicolegal assessment.

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ARTICLE HISTORY
Received: 03.11.2025
Received in revised form: 30.12.2025
Accepted: 18.02.2026
Available online: 10.06.2026

Keywords: *Infective endocarditis; non-accidental injury; paediatric haemorrhage; Staphylococcus aureus*

INTRODUCTION

Intracerebral haemorrhage (ICH) and subarachnoid haemorrhage (SAH) in children are uncommon but, like in adults, can be life-threatening emergencies. From a medico-legal standpoint, the primary challenge lies in differentiating NAI from natural causes[1]. While inflicted trauma is frequently suspected in unexplained intracranial bleeding, infection-

related vascular pathology such as infective endocarditis (IE) must also be considered[2].

Paediatric infective endocarditis (IE) is rare, with an estimated incidence of 1-2 per 100,000 children per year[3]. This condition is less common in children because the cardiac endothelium in healthy hearts is smooth and resistant to bacterial colonisation. Hence, most cases in children occur in those with congenital heart disease, prosthetic valves, indwelling catheters, or immune-compromised states[4]. In the absence of structural heart lesions, infection typically involves highly virulent organisms, especially *Staphylococcus aureus* or *Streptococcus pneumoniae*, which possess strong adhesins and invasive capacity.

Viruses seldom cause IE because they lack the adhesion molecules and enzyme systems necessary to attach to and proliferate with cardiac valves. Instead, viral infections typically cause myocarditis or pericarditis, not valvular vegetations.

IE begins with endothelial injury caused by turbulent blood flow or foreign material. This injury promotes deposition of platelet-fibrin thrombi, forming a nidus for bacterial colonization during transient bacteraemia. Bacteria adhere to these thrombi, leading to vegetation formation composed of fibrin, inflammatory debris, and microorganisms.

Adult IE presentation is typically sub-acute, often in the context of degenerative or prosthetic valves with low-grade fever, weight loss, and peripheral stigmata. In contrast, paediatric IE tends to have an acute onset, rapid progression to sepsis, and higher rates of neurological complications[5] (as seen in this case). Peripheral signs such as Janeway lesions, Osler nodes, Roth spots, clubbing, and splinter haemorrhages are less frequently observed in children because the disease course is shorter and immune complex deposition is limited.

The modified Duke criteria remain the cornerstone of diagnosis, integrating major and minor findings[6]. A definite diagnosis requires two major, or one major and three minor, or five minor criteria.

CASE PRESENTATION

A ten-year-old girl presented with fever, vomiting, and sudden collapse. CT brain imaging revealed ICH and SAH without skull fractures or external injury. The case was referred for forensic evaluation due to suspicion of NAI.

Forensic recommendations initially included a skeletal survey and fundoscopy to exclude occult injuries. However, this was not proceeded with as further investigations pointed to IE (Table 1). However, since a medico-legal examination form (MLEF) was issued for this case, medicolegal work was conducted on the sidelines- both the parents were interviewed, and there were no inconsistencies in their history. Police input was sorted, and there were no prior reports of violence (this ten-year-old girl is the elder one among two girl children).

Table 1: Key investigations and results

Investigation	Result	Interpretation
Transthoracic echocardiography	Vegetations on the mitral valve	Consistent with IE
Blood culture	Staphylococcus aureus	Source of infection
CT Angiography (of head)	No aneurysm/arteriovenous malformation	Aneurysm/arteriovenous malformation was excluded as the source of bleeding.

This child was treated with intravenous antibiotics, and she underwent close monitoring at the intensive care unit with coordinated management of paediatrics, neurosurgery, microbiology, cardiology, and forensic medicine. The final medicolegal conclusion was revised to natural disease- IE with septic emboli leading to ICH and SAH.

DISCUSSION

Spontaneous intracranial haemorrhage in children requires a broad differential diagnosis, including vascular malformations, coagulation abnormalities, neoplasms, infection, and trauma-related causes. In medicolegal practice, the absence of external injury may initially raise concern for non-accidental injury, making systematic evaluation essential for accurate classification[1,2].

Neurological complications are well recognised in infective endocarditis, occurring in a substantial proportion of cases, with ischaemic events being more frequent than haemorrhagic ones[3]. Haemorrhagic complications typically arise from septic arteritis with focal vessel wall damage and may be associated with rupture of infectious aneurysmal dilatations[3,5].

Paediatric infective endocarditis has distinct clinical behaviour compared to adults, often presenting more acutely and with rapid systemic involvement[4]. Neurological manifestations are more prominent in children, reflecting the aggressive nature of infection and high embolic potential[5]. Diagnostic confirmation relies on the integration of clinical features with echocardiographic and microbiological evidence as outlined in the modified Duke criteria[6]. Septic emboli from mitral vegetations likely lodge in cerebral arteries, producing infectious arteritis, mycotic aneurysm formation, and eventual rupture.

From a medicolegal perspective, this case underscores the importance of avoiding premature attribution of intracranial bleeding to trauma. Correlation of imaging, blood culture results, and echocardiographic findings is critical for establishing an infective aetiology and ensuring an evidence-based conclusion.

CONCLUSION

Paediatric IE remains a rare but serious condition that may present as an intracranial haemorrhage leading to suspicion of NAI. Recognition of IE's pathophysiology, risk factors, and distinctive diagnostic features is essential to avoid medicolegal misinterpretation. A multi-disciplinary, evidence-based approach, including early echocardiography, microbiology, and forensic input, ensures accurate identification of natural causes. Objective medicolegal documentation promotes justice and protects families from false allegations while supporting transparency and accountability.

ACKNOWLEDGEMENTS

The author gratefully acknowledges the guidance and supervision of Prof. Asela Mendis, Head of Department of Forensic Medicine, Faculty of Medicine, University of Colombo, in the medicolegal management and evaluation of this case from the time of issuance of the Medicolegal Examination Form (MLEF) through its subsequent assessment and interpretation.

CONFLICTS OF INTEREST

The authors declared no conflicts of interest.

ETHICAL ISSUES

The presented case was conducted for medicolegal purposes, and the findings were used for academic purposes, according to the institutional guidelines, without divulging the identity of the individual.

SOURCES OF SUPPORT

None.

AUTHOR CONTRIBUTIONS

AMH: Conception and design of the work; the acquisition, analysis, and interpretation of data for the work; drafting the work and revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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