Negligent and Inflicted Burns in Children

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KEYWORDS

• Inflicted burn • Negligent burn • Noninflicted burn • Maltreatment burn • Child abuse

KEY POINTS

- Child abuse is common, affecting 1 in 4 children, and is underreported.
- Burn injury is a common form of lethal child abuse.
- Establishing the cause of burn injury (ie, inflicted, noninflicted, or negligent) is challenging.
- Detailed examination of the burn wound, including source, location, depth, size, margins, and concomitant injury, helps to determine the cause.
- Multidisciplinary care teams involving pediatricians who specialize in child abuse, social and welfare services, and law enforcement are critical for thorough investigations of abuse.

BACKGROUND

The physical stigmata of child abuse were first described in 1946 by pediatric radiologist John Caffey.[1] He described a cluster of physical findings, including multiple metaphyseal fractures, subdural and subarachnoid hemorrhage, and retinal hemorrhage, in what he termed "whiplash shaken-baby syndrome."[1] It was not until 20 years later that Kempe and colleagues'[2] description of battered child syndrome brought national awareness to pediatric abuse, its spectrum of manifestations, and the frequently severe sequelae. Subsequently, all 50 states implemented laws requiring health care providers to report suspicions of abuse and neglect.[3,4]

Numerous studies have determined that 1 in 4 children in the United States experience some form of physical abuse during childhood, with as many as 5 deaths per day as a result of these injuries.[5,6] Despite these high numbers, the problem is underreported. As many as 50% of abuse-related injuries and fatalities are misdiagnosed or not properly reported to local and state agencies.[5,6]

Complex nuances and variations between cases make it difficult to consistently diagnose abuse with an appropriate degree of confidence. Discerning injury mechanism is difficult, and, given the associated risks of an incorrect determination of inflicted versus noninflicted injuries, it is critical that children receive evidence-based evaluations and interventions. Up to 30% of children returned to abusive homes experience ongoing abuse.[7–9] In contrast, and more difficult to measure, children who sustain noninflicted injuries may be wrongly removed from their families.[10]

Compared with other forms of child abuse, negligent and inflicted burns are a particularly difficult diagnostic problem.[11,12] Burns were not recognized in the literature as manifestations of child neglect or abuse until battered child syndrome was described in 1962.[13,14] Burns are a leading cause of abuse-related fatalities in children (6%–20%), thus it is critical to discern negligent and inflicted presentation patterns.[15–17]

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TERMINOLOGY

Pediatric burn injury is grouped into 3 categories: noninflicted, negligent, and inflicted. Often clinicians group negligent and inflicted burns under the umbrella term of abuse. However, the circumstances under which negligent and inflicted burns occur are distinct. Negligent burns occur in the setting of inadequate knowledge, attention, or resources (an act of omission), whereas inflicted burns occur because of the action of a caregiver (an act of commission). Differentiation between these two burn causes is essential from a child welfare perspective because it dictates intervention. **Table 1** provides key characteristics of negligent and inflicted burns.[18]

When grouping the 2 causes for brevity or convenience, it is most appropriate to use the term maltreatment. In addition, care must be taken to avoid the use of identifiers such as intentional when describing burns because this is a legal term and requires proof of motive or intent.

Patient Presentation and Evaluation

Characteristic presentations and patterns often accompany neglect and inflicted causes (**Fig. 1**). Cases with single-parent providers, historical inconsistencies, delayed presentations, genital and perineal injuries, immersion lines or circumferential burns, clearly defined contact wounds, and concomitant or variably aged injuries are strong indicators that the burns resulted from negligent or inflicted causes (**Table 2**).[9,12–14,18]

Table 1
Distinguishing features between negligent and inflicted burns

Burn Features	Negligent (%)	Inflicted (%)
Historical Details		
Historical inconsistency	27	78[a]
Burn Pattern		
Bilateral	33	67[a]
Burn Location		
Lower legs	3	22[a]
Concomitant Injuries		
Fracture	3	13[a]
Hematoma	3	13[a]
Postadmission Interventions		
Split-thickness skin graft applied	33	66[a]

All of the listed features are significantly more common in inflicted burns than in negligent burns.
[a] *P* value less than .05.

BURN HISTORY

During the initial history and physical examination, it is critical to evaluate for negligent and inflicted burns. Components of the burn history should include:

- Preceding events
- Setting of injury
- Sequence of events during burn injury
- Status of patient's clothing
- Burn source
- Time and temperature of exposure
- First aid administration
- Initial burn appearance
- Interpretation of severity
- Time from injury to medical care

Historical inconsistencies should raise suspicions for maltreatment burns. History from multiple sources is valuable and documentation is critical. Only 10% of noninflicted cases reveal inconsistency, whereas 78% of patients with inflicted burns and 27% of patients with negligent burns do (see **Table 2**).[18,19] Caregivers likely falsify their stories to avoid punishment but injured children may also report an untrue history because of fear of retaliation or relocation. Following discovery of historical inconsistences, the health care team must collaborate with local law enforcement and child welfare agencies because they often signal a need to evaluate for other signs of abuse (ie, skeletal surveys, urine and hair toxicology, field investigations).[20]

Maltreatment burns are also associated with delayed presentation to care without sufficient reason.[19] Although noninflicted burns may occur days before presentation, usually clear evidence exists of the use of first aid with anticipated recovery and/or receipt of outpatient medical attention.[16,19]

DEVELOPMENTAL AND MEDICAL HISTORY

Close attention to the child's physical and mental development relative to expected milestones is crucial to understand the potential for noninflicted injury (eg, pulling to stand on a stove, climbing into a tub).[21] Incorporating knowledge of the average ages at which children can roll (3 months), sit-up (6 months), crawl (9 months), walk (12 months), and develop certain motor skills (eg, grasp and pinch) allows providers to determine whether or not a child is capable of performing the actions that a caregiver reports during the burn history