What’s new in critical illness and injury science? Nonaccidental burn injuries, child abuse awareness and prevention, and the critical need for dedicated pediatric emergency specialists: Answering the global call for social justice for our youngest citizens

INTRODUCTION

The most difficult clinical situations faced by physicians are child abuse/neglect and pediatric mortality. These phenomena are tragic, illogical, unnatural, emotional, and uncomfortable. They are also associated with significant distress and long-term consequences for communities, families, and healthcare providers. The World Health Organization reported approximately 6.6 million deaths in children <5 years of age in 2012, which has decreased significantly since the United Nations introduced the Millennium Development Goals that included child health and well-being. Although child abuse and neglect continue to occur, appropriate steps to extinguish these maladies are being pursued. Despite this progress, child abuse/neglect and pediatric mortality should continue to feature prominently on the global socio-political agenda, with increasing amounts of resources dedicated to address and ensure the well-being of our younger generations at the global level.

NONACCIDENTAL INJURIES

Trauma, whether accidental or intentional, is a leading cause of mortality among children. Within the subset of pediatric trauma, burn injuries (both thermal and in some cases chemical) can be devastating because of their long-term psychological and functional sequelae, as well as the fact that up to 20% of pediatric burns may be nonaccidental in nature. When treated inappropriately or in an untimely fashion, burn injuries can have severe detrimental effects, especially when combined with preexisting factors such as child malnutrition. Most burn victims are initially brought to emergency departments, where they are evaluated and treated by emergency physicians prior to the involvement of surgical and wound care experts. Therefore, emergency medicine physicians need to be specifically trained in this clinical area of expertise, including appropriate resuscitation techniques, wound care, prevention of sepsis, and the ability to recognize child abuse.

In the current issue of the International Journal of Critical Illness and Injury Science, two articles serve to highlight the magnitude of the above problem and help provide solutions to this ongoing tragedy among the truly defenseless. In their manuscript on pediatric burns, Sener et al. point out that child abuse continues to be a problem and may be associated with phenomena such as discharge against medical advice, especially when no dedicated child protections exist to prevent abusive parents, relatives, or guardians from removing the child from medically indicated care and/or follow-up. Neither active nor passive abuse should ever be tolerated. Child welfare should always take priority over the needs of the adult caretakers and no factor, especially financial and accommodation problems should prevent the child from receiving appropriate medical care. In the article’s conclusion, the authors clearly state that discharge against medical advice and/or lack of appropriate follow-up should be perceived as possible child abuse or negligence. They also make an appeal - a call to action - stating that physicians, other healthcare professionals, as well as legal authorities and all those directly and indirectly responsible for child welfare, should intensify the push for better child protective mechanisms.

PEDIATRIC EMERGENCY MEDICINE AS SUPERSPECIALTY

In the subsequent article, Mahajan et al. outline the creation of pediatric emergency medicine in India. This state-of-the-art guideline provides an excellent overview of key components of both academic and clinical training of future pediatric emergency medicine specialists in one of the most populous countries on the planet. In the 1980s, the concept of pediatric emergency medicine fellowships came into existence in the USA to equip pediatric or emergency medicine residency graduates with appropriate skills and procedures to treat acutely ill children. Recently, this movement started to gain traction globally. One such example is the recognition of pediatric emergency medicine as a superspecialty by the Medical Council of India in 2015. Clearly, pediatric
emergency medicine is a necessity in the increasingly complex world of modern medicine. The implementation of pediatric emergency medicine training in India could provide numerous benefits beyond the improvement of child health and decreasing pediatric mortality.

One might ask, how does the White Paper by Mahajan et al.[15] contribute to solving the problems of child abuse/neglect and pediatric mortality? The answer is simple - it addresses these problems directly and at the systemic level. First, the creation of academic pediatric emergency departments in India will lead to the evolution of more advanced child protective mechanisms. Second, the presence of pediatric emergency specialists will help raise awareness of the gravity and magnitude of the problem. Finally, the White Paper tackles the problems of child abuse/neglect directly, under “core curriculum and rotations” by clearly and unequivocally stating: “…Child maltreatment and abuse are prevalent in society and often go unrecognized in pediatric emergencies…” and then emphasizing that “…Sensitization of pediatric emergency residents to these conditions... also needs to be incorporated in the curriculum.”[15]

Within the latter context, nonaccidental trauma should be an important component of all pediatric, emergency medicine, and pediatric emergency training curricula, and all those who practice pediatrics or emergency medicine should be proficient in this clinical area. Indeed, any medical provider who cares for children in any capacity should receive formal training in abuse detection. Abuse can take many forms including neglect, physical abuse, sexual abuse, and emotional abuse; thus, the clinical presentations may vary considerably.[15,16] Moreover, most cases of abuse do not become apparent until suspicious clinical or imaging findings are made, often incidentally during evaluation for other issues.[17,18]

**SUSPECTED CHILD ABUSE & NEGLECT: WHAT ARE THE SIGNS?**

Clinical history, “red flags,” associated with nonaccidental trauma include “evasive” or changing stories, delayed presentation without a valid reason, no explanation or an improbable mechanism of injury, inconsistency between the clinical and stated appearance of the injury (e.g., an old fracture claimed to be acute), evidence of inadequate child supervision (e.g., neglect), lack of appropriate guilt about the incident, and lack of appropriate concern about prognosis or treatment.[20] If there is any doubt as to the accuracy of the history involving a verbal child or if the child seems unduly uncomfortable with parents present, the potential abuse victim should be interviewed privately to verify the events of the injury.

In addition to a thorough clinical history and physical examination, standard imaging protocols should be followed when nonaccidental trauma is suspected. Initial imaging should be based on clinical presentation and evaluation of acute issues that need immediate attention. This may include abdomen and pelvis computed tomography in suspected intra-abdominal injury to assess for commonly seen intra-abdominal injuries in nonaccidental trauma (e.g., hollow viscus and pancreatic injury).[21‑23] Subsequent imaging once the acute issues are addressed should begin with a skeletal survey in children younger than 2 years of age.[24‑25] Skeletal survey in this age group is crucial for detection of additional injuries, particularly those that are most specific for nonaccidental trauma, such as metaphyseal corner fractures and posterior rib fractures.[26] A skeletal survey should consist of (at minimum) antero-posterior (AP) and lateral skull, lateral spine, AP and bilateral posterior oblique chest (e.g., “ribs technique”), AP pelvis, AP femurs, AP each leg, AP humeri, AP forearms, postero-anterior images of each hand, and AP of each foot.[25,27] A follow-up survey at 2 weeks may be performed if initial survey was equivocal and/or suspicion remains high.[25,28‑30] Nuclear medicine bone scan should only be performed for unclear cases or when skeletal survey is negative or equivocal, but suspicion remains high.[17] Children between the ages of 2 and 5 have less clear benefit of skeletal survey and imaging is often driven by the specific clinical presentation, though skeletal survey may still be beneficial.[25,28‑30] In children older than 5, neither radiography nor nuclear bone scan has shown clear benefit. In these children, the clinical presentation should drive diagnostic/confirmatory imaging.[25,28‑30]

In the context of the article by Sener et al.,[10] practitioners should also be aware of various common patterns of nonaccidental burn injury, including suspicious chemical (e.g., “acid”) burns, injuries involving various recognizable patterns (e.g., cigarette, lighter, and iron), burns to anatomic areas associated with higher abuse risk (e.g., soles, palms, genitalia, buttocks, and perineum), symmetrical injuries, scalding injuries without evidence of splash marks, restraint injuries of upper or lower limbs, the presence of sparing of flexion creases, areas of spared skin surrounded by scalding, and other signs of physical abuse.[20] Skeletal surveys should be performed in all cases of fatal suspected nonaccidental trauma or unexplained infant death. Postmortem imaging has also been utilized in forensic applications and may offer valuable insights regarding cause-of-death even when traditional autopsy is declined or not performed.[31,32]

**LIFE-LONG SEQUELAE OF CHILD ABUSE & NEGLECT: NEUROBIOLOGICAL & SOCIETAL PERSPECTIVES**

Being a victim of abuse or witnessing violence in early childhood may result in neurobiological changes and
serious mental health sequelae later in life. Early mental and physical trauma has been associated with cognitive difficulties such as poor academic performance, low intelligence quotient scores, inferior language skills, poor memory, lack of inhibition, and an inability to focus on a task. These problems can persist into adolescence and adulthood. A history of victimization (as well as witnessing violence) in childhood may increase the risk of subsequent marriage to an abusive mate, and childhood cumulative trauma (but not adulthood trauma) may predict the complexity of symptoms of posttraumatic stress disorder in adults. Brain neurobiology is at the heart of the problem, with well-documented differences in neuroanatomy and cognitive function among children who are victimized. These differences suggest that effects of maltreatment span an entire spectrum from structural anatomic changes to alterations in various physiologic and signaling pathways. 

Thus, subjecting children to abuse or allowing them to witness violence may adversely affect their functioning and productivity as future adult members of society. In this issue of IJCIS, the caution suggested by Sener et al. in the approach to the evaluation of burns in children and the Joint Working Group White Paper by Mahajan et al. in regard to specialty training in pediatric emergency medicine are timely and prescient because there are nearly 300 million children exposed to violence at home across the world. This estimate is probably conservative because many nations simply do not document such statistics. Tragically, children who are exposed to violence in the home are 15 times as likely to be physically or sexually abused, and up to 30% of children who are repeatedly abused die as a result of nonaccidental trauma.

CONCLUSION

The authors of this editorial would like to join the call to action by Sener et al. and appeal to physicians, nurses, other healthcare professionals, legal and political authorities, governmental and multinational agencies, as well as all individuals directly and indirectly responsible for child welfare, to help coordinate a global effort to provide injured children and their families hope for a better future and strengthen the basic public health foundations of a democratic and just society.

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