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Physical Abuse in Children : A Surgeon's Perspective

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Abstract ***Background:*** **Physical abuse in children is one category of child abuse which surgeons are usually consulted. Its prevalence is anticipated to be increased as a result of the more stressful society. The natures of the victims, the perpetrators, the injuries, the management and its outcomes are the crucial data for the handling of this complicated problem.**

Materials and Methods: **Retrospective data collection was carried out from the records of all children diagnosed with physical abuse, who were admitted to the Children's Hospital, Bangkok, during a recent ten-year period (1992-2001).**

Results: **Of the 12 intentionally injured children, all but one were younger than 5 years of age, and half were younger than 1 year of age. Two-thirds of these abuses occurred in the last 4 years. Ten abusers were males. Head injury, abdominal injury, fractures, skin and soft tissue injuries were seen in 5, 6, 7, and 11 patients respectively. Several of whom had multiple injuries. Seven patients required surgical intervention: two for head injury, and five for abdominal injury. One patient died from massive hemorrhage. Of the eleven who recovered; two were discharged home, but nine ended up in charitable institutions.**

Conclusion: **The victims of physical abuse were usually very young infants. Direct blows and beating were the mechanism of assault. Head and abdominal injuries were often severe and required surgery. Fractures were mostly multiple and thus were a good clue to the diagnosis. Long-term fate of these victims are miserable.**

Violence is the dark side of human nature. The stronger oppresses the weaker, women and children are thence always the victims. Intentional injury to children conducted by parents or by others, who are supposed to provide them with care, indicates the illness of a family. Maltreatment of children is traditionally categorized as physical abuse, sexual abuse, emotional abuse, and neglect. Usually, surgeons are consulted when the patients are physically injured. This communication reports our experience with physical abuse in children during the recent ten-year period in a surgeon's perspective.

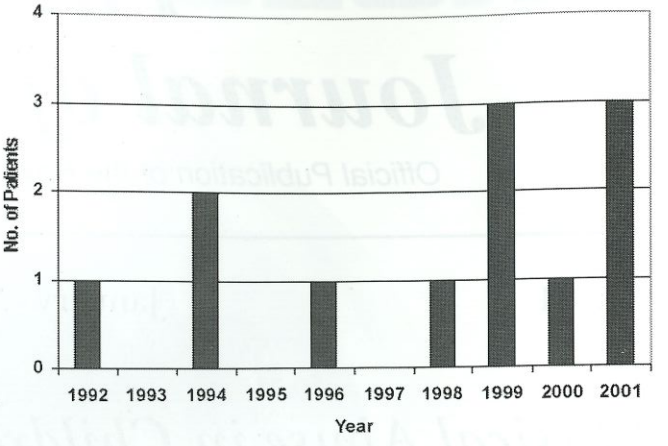

Fig. 1 Yearly distribution of the 12 physically abused children.

Materials and Methods

The medical records of all children diagnosed with child abuse, admitted to the Children's Hospital, Bangkok, during a 10-year period (1992-2001) were reviewed. Sexual abuse, emotional abuse, and neglect cases were excluded from this study. Only the ones who sustained physical injuries were included.

Providers of care were multidisciplinary which included a pediatrician, a pediatric surgeon, a psychiatrist, and welfare workers. A complete radiographic skeletal survey was done in all infants in whom there was a suspicion of abuse. Age of the patients, sites of injuries and results of treatment were analyzed. Long-term fates of these children were anticipated.

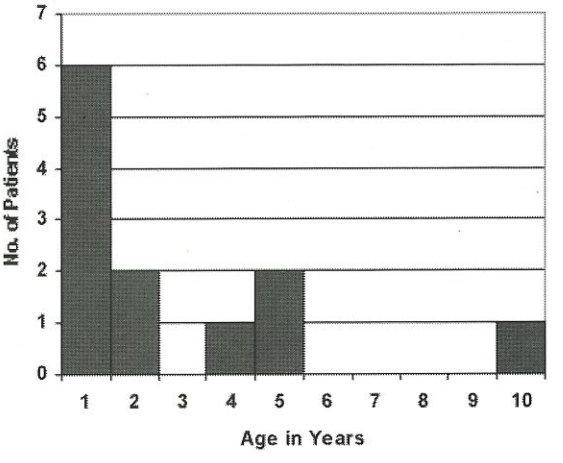

Fig. 2 Age distribution of the 12 physically abused children.

Results

From 1992 through 2001, 32 children were admitted with the diagnosis of child abuse. Of these, twelve patients were physically abused, two-thirds of which occurred in the last 4 years (Figure 1). All but one were younger than 5 years of age, and 50 percent were younger than 1 year of age (Figure 2). Seven were males and five were females. History given primarily to the physicians was not correlated with the physical findings in 6 patients, while it was specified as beaten in the other six. Regarding the abusers ; seven were fathers, two were stepfathers, one was grandmother, one was uncle, and one was unknown. This information was obtained either from an interview by a psychiatrist or from an interrogation by police officers. As for the referral persons; six were mothers, three were agents of non-governmental organizations (NGOs), one each was grandmother, teacher, and neighbor. All cases with NGOs involvement were sensationally reported in the media and intrigued certain politicians. Concerning the organs of involvement, it was categorized as head injury, abdominal injury, fractures, skin and soft tissue injuries.

Head injury

Five patients had head injury. All of them were very young infants, and had bruises on their heads and faces, indicating direct blows as the mechanism. Details of the injuries to the skull, to the brain and their treatments are shown in Table 1. Four patients also sustained rib and/or long-bone fractures. Data of fundoscopic findings were not available.

Abdominal injury

Six patients had injuries to the abdominal viscera.

Table 1 Head injury in 5 patients

No.	Age	Skull	Brain	Treatment
1	1 month	Blowing fracture, left parietal bone	Contusion Subarachnoid hemorrhage Epidural hematoma	Conservative
2*	1 month	No fracture	Diffuse edema Subdural hematoma	Subdural tap
3*	2 months	Fracture, left parietal bone	Subdural hematoma	Burr holes and irrigation
4*	4 months	Fracture, right parietal bone	Subdural hematoma	Conservative
5*	1+ year	No fracture	Subdural hemorrhage (interhemispheric fissure)	Conservative

**Also had rib fractures and/or long-bone fractures*

Table 2 Abdominal injury in 6 patients

No.	Age	Injuries	Treatment
1*	11 months	Hemoperitoneum 150 ml Laceration of mesentery, gangrene of right colon Laceration of pancreas	Right half colectomy Repair of pancreas
2	1+ year	Necrosis around pancreas	Debridement Drainage Gastrostomy (Operated elsewhere)
3*	5 years	Intramural hematoma of duodenum	Conservative
4*	1+ year	Rupture of bladder	Repair of bladder Cystostomy
5*	3 months	Leak of esophagus	Esophagoscopy Gastrostomy
6	4+ years	Hemoperitoneum 1,000 ml Avulsion of hepatic veins and inferior vena cava	Repair of vena cava

**Also had rib fractures and / or long-bone fractures*

Most of these were severe and required surgical intervention. Details are shown in Table 2. All except one were inflicted by direct blows to the abdomen. Four patients also had rib and / or long-bone fractures. Three had bruises on their faces or trunk. One (No. 1 in Table 2) had generalized incense-stick burn wounds at various stages of healing previously misdiagnosed as Pemphigus vulgaris. One infant (No. 5 in Table 2) presented with choking upon feeding. Esophagography revealed a leak of the esophagus forming a false tract without mediastinitis (Figure 3). She also had rib and long-bone fractures at different stages of healing. The leak of the esophagus hence was presumed to be resulted from intentional corrosive feeding. Esophagoscopy and feeding gastrostomy were performed. Spontaneous healing of the leak was expected and confirmed on follow-up esophagography (Figure 4).

The latest and most severe victim in this study (No. 6 in Table 2) presented with pallor, abdominal distention, and hypovolemic shock. Laparotomy revealed avulsion of the hepatic veins and the inferior vena cava with massive hemorrhage. Repair of the vena

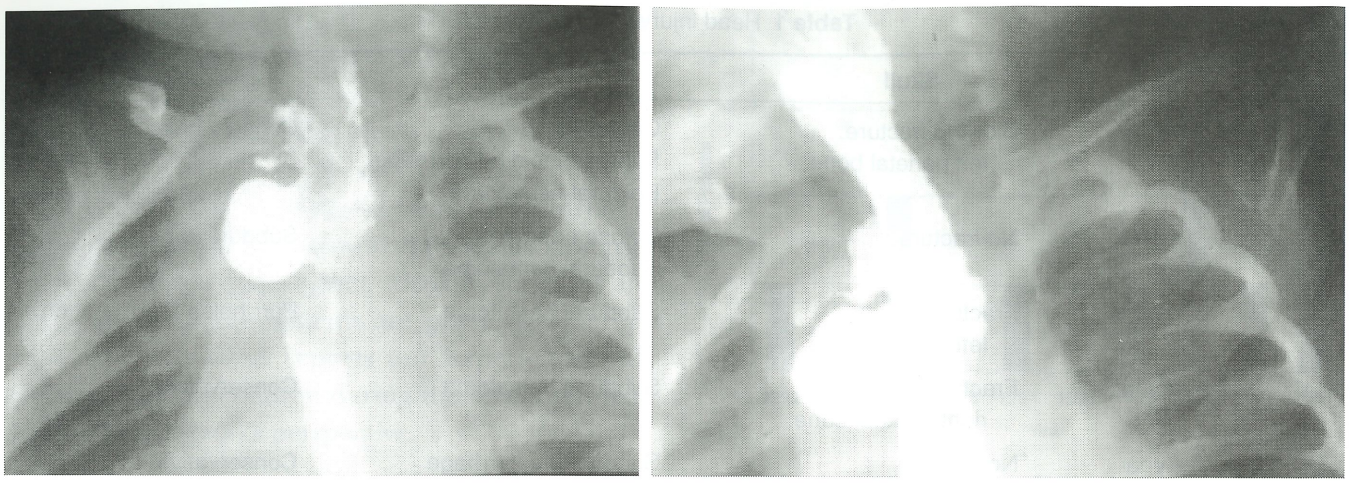

Fig. 3 Esophagography : leak of the esophagus forming a false tract.

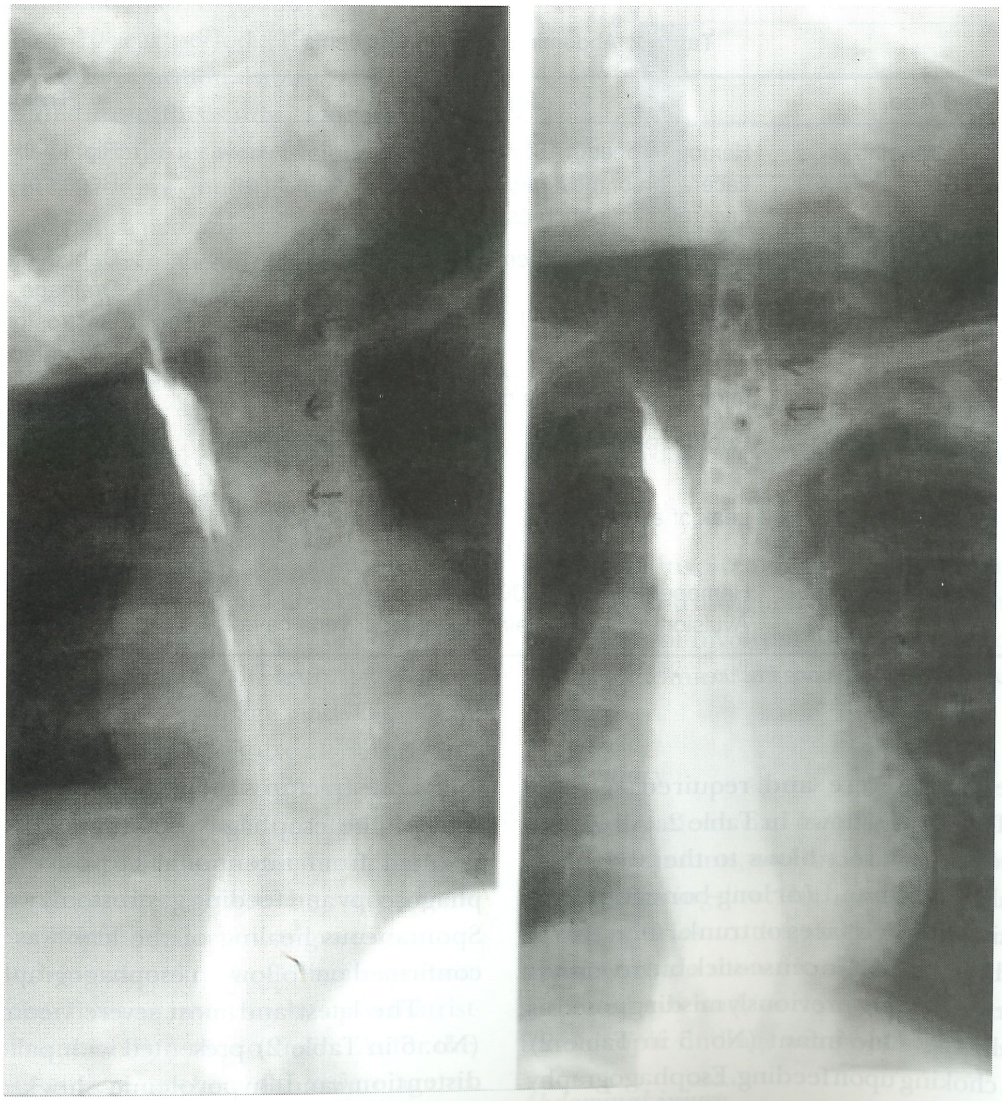

Fig. 4 Esophagography : same patient as in Figure 3, three months later. Note the healing of the leak and resolution of the false tract.

cava was not successful and the patient died during surgery . This was the only mortality in the series.

Fractures

Apart from skull fractures which is shown under the heading of Head injury, seven patients had skeletal fractures (Table 3). All rib fractures were multiple and at various stages of healing (Figure 5). Long-bone fractures had no specific pattern or characteristic. One infant (No. 5 in Table 3) had fracture of the superior pubic ramus and rupture of the bladder.

Table 3 Fractures, excluding skull fractures, in 7 patients

No.	Age	Ribs	Long Bones and Others
1	1 month	Multiple Clavicles, both	Femurs, Tibias, Fibulas
2	11 months	Multiple	-
3	2 months	Multiple Clavicle, left	-
4	5 years	-	Humerus, right Metacarpal, left
5	1+ year	Multiple	Superior pubic ramus
6	3 months	Multiple	Femur, left
7	4 months	-	Humerus, left

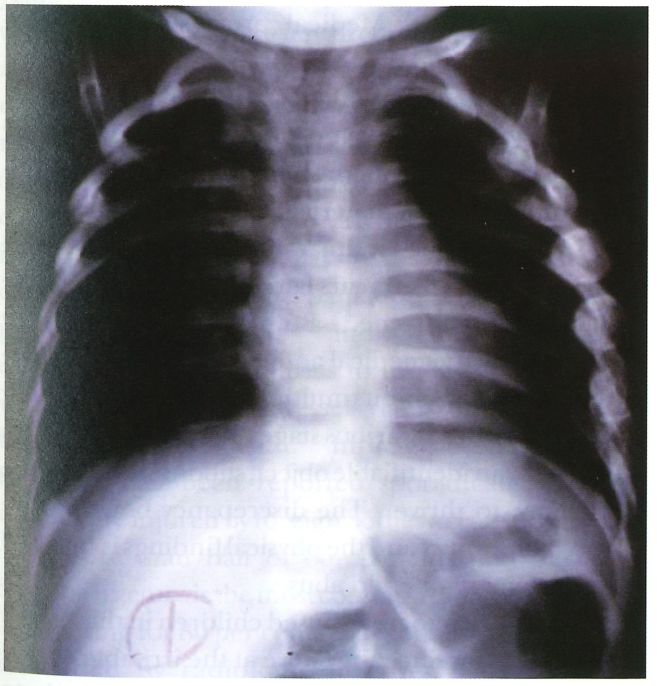

Fig. 5 Chest film : multiple rib fractures at different stages of healing.

Skin and soft tissue injuries

Eleven patients sustained skin and soft tissue injuries: involving the head and face in ten, the whole body in four, and the extremities in five. Regarding types of the lesions; nine had bruises, one had generalized incense-stick burn wounds, one had an iron burn, and one had multiple scars over the extremities. Skin and soft tissue injuries provided the most readily discernible lesions on physical examination

Fig. 6 Bruises on the face and body.

Fig. 7 Burn wound at left forearm, clearly identifiable as inflicted by an iron.

Fig. 8 Lip ulcers caused by application of rubber glue.

(Figure 6). Burns from a solid source had identifiable characteristics (Figure 7). Lip ulcers caused by rubber glue, applied to silence the child, were also remarkable (Figure 8).

Treatment and outcomes

Seven patients required surgical intervention: two for head injury (Table 1), and five for abdominal injury (Table 2). All fractures were treated conservatively. Skin and soft tissue injuries also healed expectantly. One patient, who had avulsion of the hepatic veins and the inferior vena cava, died from massive hemorrhage. The other eleven patients recovered, two were discharged home, but nine ended up in charitable institutions.

Discussion

Cruelty to children, afflicted by their parents, has been recognized since old time. In certain communities, infanticide was not uncommon nor sporadic but scarily systematic.[1] The idea that children possess a "right" to reasonable treatment from their parents was established in the late nineteenth century. Private philanthropist, not the medical profession, directed the campaign against child abuse.[1] Unfortunately, public interest in this issue had declined since 1910s, as a result of the two world wars and protracted economic crisis.[1] Medical profession dates the "discovery" of child abuse from the mid-1950s, when American radiologists noted a connection between skeletal lesions in infants and parental maltreatment.[2,3] However, widespread medical concern about the abuse of the young did not materialize until Kempe et al, in 1962, published the landmark article on the battered child syndrome.[4] Ten years later, Caffey described the shaken baby syndrome.[5] Both syndromes are now recognized by the medical and legal professions. The victims usually exhibit multiple injuries, including fractures, bruises at various stages of healing, lesions in the shape of an identifiable object, subdural hematoma, and failure to thrive. The discrepancy between the history of the injury and the physical findings is cardinal to the suspicion of child abuse.

The majority of the abused children in this review were very young since they were at the irritable end of the normal spectrum, demanding, and difficult to manage. Ten abusers (83%) were males, a pheno-

menon as observed in other mammals. Rise in the prevalence since 1998 may be related to the stress from the 1997 economic crisis in this country, in addition to the more awareness of the occurrence of child abuse.

Severe accidental head trauma is uncommon in children younger than 2 years of age, and most cases of serious intracranial injuries in infants are the result of abuse.[6] Subdural hematoma is significant as its concomitant brain injury often leads to death or serious long-term disability. Household accidental subdural hematoma is very unlikely, and in the presence of concurrent rib or long-bone fractures, with no plausible explanation, strongly suggests an intentional injury. Infants with shaken baby syndrome manifest symptoms and signs of increased intracranial pressure resulted from cerebral edema without skull fracture and external soft tissue trauma.[5] Retinal hemorrhages are often present and are considered specific.[7] In our patients with head injury, all had bruises on their heads and faces indicating direct blows as the mechanism. No one fitted in with shaken baby syndrome. Thus it was presumed that shaking the baby was not, but beating was, the assault act of the perpetrators.

Abdominal injury in abused children tends to be severe and delayed in seeking treatment.[8,9] Unlike inflicted head and skeletal trauma, abdominal injuries are found predominantly in children older than 2 years of age. [9,10] However, in our series, young infants were not spared and even predominated. The mid-abdomen is especially vulnerable to direct blows causing compression injuries to the anatomically fixed viscera; namely the duodenum, mesentery, and the pancreas, against the spine.[10-14] Intramural hematomas of the duodenum and intestine are more common than intestinal perforation.[15] Pancreatic trauma is the most common cause of acute pancreatitis and pancreatic pseudocyst in children,[16-18] and one third of these are related to abuse.[16] Injuries to the liver, spleen, and worst of all, the great vessels, can result in massive hemorrhage and death.[9] Inflicted esophageal perforations had been reported sporadically, most of which were injured by foreign bodies or caustic agents.[19]

More than half of our patients had fractures. Skeletal fracture is the most common radiologic finding accounting for 80 per cent of all abuse-related injuries identified by radiologic imaging.[15] A complete radiographic skeletal survey hence should be done in all infants in whom there is a suspicion of abuse. Long-bone fractures are the most common inflicted skeletal injury.[15] They can be spiral or transverse, depending on the assaulting force. Metaphyseal- epiphyseal injuries are less frequent, but are considered highly specific to nonaccidental injury, since the forces necessary to produce such fractures can hardly be generated from simple accidents.[20-22] Rib fractures have been reported in 5-27 per cent of abused children.[15] In infants, the rib cage is relatively compliant and rarely breaks. Thus, in the absence of major trauma, rib fractures in infants, especially if multiple, must be considered evidence of nonaccidental injury.

Skin and soft tissue injuries are overt and easily detected. Bruises are the most common lesion. Two black eyes are strongly suggestive of abuse.[23] Cigarette or incense-stick burn wounds may be misleading, but burns from a solid source have identifiable patterns. All but one patient in our series had skin and soft tissue injuries indicating that direct beating was the perpetrators' choice. The magnitude and extent of these injuries usually lead to suspicion of abuse.

Surgical treatment is rather straightforward as directed by the injury. However, it solves only the iceberg tip of a much more vicious and sophisticated social problem. The management is further complicated when it involves the NGOs, the media, and the politicians. Each of whom serves one's own interest but not the child's. Long-term fate of these victims are miserable regardless of whereabouts they end up in, either home or charitable institution.

Most abuse occurs in families so prevention should be targeted there. Unfortunately, parental unpreparedness and irresponsibility hardly make such effort fruitful. Child abuse is often repeated in a family and often transmitted from one generation to the next. The outlook on its solution is painfully dim.

In conclusion, if only surgery is concerned, the lessons learned from this review are : (1) the victims of physical abuse were usually very young infants, (2) direct blows and beating were the mechanism of assault, (3) head and abdominal injuries were often severe and required surgery, and (4) fractures were mostly multiple and thus were a good clue to the diagnosis.

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