REVIEW ARTICLE

Forensic Investigation of Child Victim with Sexual Abuse

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Sexual abuse includes any activity with a child, before the age of legal consent, that is for the sexual gratification of an adult or a significantly older child. Sexual mistreatment of children by family members (incest) and nonrelatives known to the child is the most common type of sexual abuse. Intrafamiliar sexual abuse is difficult to document and manage, because the child must be protected from additional abuse and coercion not to reveal or to deny the abuse, while attempts are made to preserve the family unit. The role of a comprehensive forensic medical examination is of major importance in the full investigation of such cases and the building of an effective prosecution in the court. The protection of the sexually abused child from any additional emotional trauma during the physical examination is of great importance. A brief assessment of the developmental, behavioral, mental and emotional status should also be obtained. The physical examination includes inspection of the whole body with special attention to the mouth, breasts, genitals, perineal region, buttocks and anus. The next concern for the doctor is the collection of biologic evidence, provided that the alleged sexual abuse has occurred within the last 72 hours. Cultures and serologic tests for sexually transmitted diseases are decided by the doctor according to the special circumstances of each case. Pregnancy test should also be performed in each case of a girl in reproductive age.

***Key Words**:* Child, Forensic, Sexual abuse.

Child sexual abuse is a global public health problem. It is a cruel and tragic occurrence and a serious infringement of a child's rights to health and protection. Till the early 1970s, child sexual abuse was thought to be rare, and centered among the poor. Experts now agree that child sexual abuse exists in all socioeconomic groups. Increased public awareness has led to greater reporting; from 1970 to 1990, child sexual abuse reports increased more than other categories of neglect or abuse(1). Despite this gain, child sexual abuse still remains vastly under-reported. WHO estimates that globally some 40 million children aged 0–14 years suffer some form of abuse and neglect requiring health and social care(2). Figures from USA show that 1 in 4 girls and 1 in 6 boys is sexually abused before the age of 18, whereas the median age for reported abuse is 9 years old(3-5). The exact magnitude of the problem in other areas in Asia and Africa is not known but it is probably even greater (6-10).

DEFINITION OF CHILD SEXUAL ABUSE

Sexual abuse includes any activity with a child, before the age of legal consent, that is for the sexual gratification of an adult or a significantly older child. Sexual abuse includes oral-genital, genital-genital, genital-rectal, hand-genital, hand-rectal, or hand-breast contact; exposure of sexual anatomy; forced view of sexual anatomy; and showing pornography or using a child in the production of pornography. Sexual intercourse includes vaginal, oral, or rectal penetration. Penetration is entry into an orifice with or without tissue injury.

Child abuse or maltreatment constitutes all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity, in the context of a relationship of responsibility, trust or power(2).

Child sexual abuse is the involvement of a child

in sexual activity that s/he does not fully comprehend, is unable to give informed consent to, or for which the child is not developmentally prepared and cannot give consent, or that violate the laws or social taboos of society. Child sexual abuse is evidenced by an activity between a child and an adult or another child who by age or development is in a relationship of responsibility, trust or power; the activity being intended to gratify or satisfy the needs of other person. This may include but is not limited to: the inducement or coercion of a child to engage in any unlawful sexual activity; the exploitative use of a child in prostitution or other unlawful sexual practices; and the exploitative use of a child in prostitution or other unlawful sexual practices; and, the exploitative use of children in pornographic performance and materials(2).

Child sexual abuse should be differentiated from sexual play, which is defined as viewing or touching of the genitals, buttocks, or chest by preadolescent children separated by not more than 4 years, in which there has been no force or coercion(11).

Sexual mistreatment of children by family members and non-relatives known to the child is the most common type of sexual abuse. The traditional definition of incest was sexual intercourse between blood relatives. There is, however, an evolving definition of incest that takes into consideration the betrayal of trust and the power imbalance in these one-sided relationships. One such definition is: "the imposition of sexually inappropriate acts, or acts with sexual overtones ... by one or more persons who derive authority through ongoing emotional bonding with that child"(12). This definition expands the traditional definition of incest to include sexual abuse by anyone who has authority or power over the child, which means immediate/extended family members, babysitters, school teachers, scout masters, or priests/ministers and others.

Intrafamiliar sexual abuse is difficult to document and manage, because the child must be protected by additional abuse and coercion not to reveal or to deny the abuse while attempts are made to preserve the family unit(11).

INTERVIEWING THE VICTIM

Even in legally confirmed cases of sexual abuse, most children do not have physical findings diagnostic of sexual abuse. Therefore, the child's disclosure is often the most important piece of information in determining the likelihood of abuse. The conversation should begin with topics that are interesting and not "threatening" for the child. The examiner should be patient and friendly and spend time getting acquainted with the child in order to establish the desired level of relationship. Children are frightened by a hurried or demanding examiner, but they generally respond sufficiently to and cooperate with a pleasant one. It is not necessary for the examiner to wear a lab coat or other hospital and medical suit; such apparel may be frightening for younger children.

The interview should be conducted with the child alone, except if definite information by the authorities about the identity of the perpetrator excludes the involvement of the child's caretaker in the abuse. Children should be asked if they know why they have been brought to the doctor and to relate what happened to them. Open-ended questions such as "Has anyone ever touched you in a way that you didn't like or in a way that made you feel uncomfortable?" should be asked. The child's statement should be recorded in its own words. Whenever possible, the nature of the sexual contact, including pain, penetration and ejaculation, should be ascertained. Careful documentation of questions and responses is critical(13-15).

PHYSICAL EXAMINATION

Each examination should include a complete physical examination with careful recording of any trauma away from the genital area. Although such injuries can be serious, they can be overlooked when the examiner focuses attention only on the genital area. There is a spectrum of injuries from incipient bruises, fresh abrasions and lacerations, up to evidence of prolonged physical abuse of the child with healing injuries of various types and ages and old scars. In some assaults, restraining force is severe enough to leave "fingertip" and other bruises on the limbs or strangling marks on the neck. Trauma to breast, inner thigh or other paragenital areas is quite frequent (13,16). Bite marks are common in sexual assaults and it is important to measure and

photograph them carefully to allow matching or exclusion of the teeth of the alleged assailant(17).

ASSESSMENT OF THE GENERAL MATURITY

A comprehensive assessment considering the physical development and emotional wellbeing of the child against the background of any relevant medical, family or social history must be undertaken. This enables a full evaluation of the degree of harm suffered, or likely to be suffered, by the child. The examination begins with an evaluation of the child's general appearance, hygiene, and nutritional status. A full clinical inspection must be undertaken(13-15). Skeletal radiology survey should also be included as it can aid with regard to the determination of healed skeletal injuries, as well as to the assessment of age, mainly in cases of neglected children(18). Medical history with special emphasis to previous hospitalizations because of repeated and suspicious accidents should be obtained(19).

Psychological assessment may often reveal post traumatic stress disorder, a clinical syndrome whose symptoms fall into three clusters: re-enactment of the traumatic event; avoidance of cues associated with the event or general withdrawal; and physiological hyperreactivity. The development of sexualized behavior, also called sexually reactive behavior, is another common negative short-term effect of sexual abuse. Children who have been sexually abused engage in more sexualized behavior. Nonspecific behaviors include suicide gestures, fear of an individual or place, nightmares, sleep disorders, regression, aggression, withdrawn behavior, post-traumatic stress disorder, depression and anxiety, promiscuity, general behavior problems, poor self-esteem, poor school performance, self-mutilation, fire setting, multiple personalities, phobias, eating disorders. The impact of the abuse, however, may be minimal at the time of exposure, especially among younger children and when the perpetrator is a familiar person. It is only when the child has acquired the necessary insight and perspective that feelings of anger and sadness begin to emerge. That means that the doctor may observe nothing more serious than an emotional stress when examines the child. The most psychological disturbances, or even genuine psychiatric diseases, appear in their adult life(2,20-24).

If the examiner does not have all the necessary knowledge, skills and experience for a particular pediatric forensic examination, two, or more, doctors with complementary skills should conduct a joint examination. Usually such examinations involve a forensic medical examiner and a pediatrician. However, it may be necessary to involve another medical professional such a genitourinary physician or family planning doctor. The above doctors may also substantially help in the further care of the victim (psychological support, treatment of infections and/or sexually transmitted diseases, pregnancy testing and contraception advising)(13).

ANOGENITAL EXAMINATION OF THE FEMALE CHILD VICTIM

An infant or a very young girl can be examined either on the examining table or while on a parent's lap. During the genital and anal examination, the assisting nurse or the mother positions the child and separates the child's thighs so that the examiner can inspect the genital and the anal areas. For a vaginal examination, girls 4 to 5 years of age or older are best examined while they are lying in a supine recumbent position, with the knees flexed and the heels against the buttocks, in a frog-leg position, on an ordinary examining table. The vaginal and anal examination should be repeated with the child in the knee-chest position, knees flexed at a 90-degree angle, head turned, and back swayed. The supine knee-chest position having the child flex her thighs on her abdomen, is often more comfortable for her and also gives excellent exposure. A satisfactory view is also obtained by placing the child in the left lateral position, one that often causes less distress to a child than having her lie supine(25).

The use of labial traction can greatly enhance visualization of the hymen. The labia majora are gently retracted between the thumb and forefinger with force applied downward and outward. Locations of abnormalities should be described as on a clock face with the urethra in the 12-O'clock position and the anus at the 6-O'clock position. In pubertal girls, estrogen causes the hymenal tissue to become thicker and more compliant; therefore, detection of trauma can be more challenging(26).

The examiner should take particular note of vulvar inflammations, eruptions, open lesions, tears, pain, and discharge. The patency of the hymenal orifice is determined, the size of the introital opening measured, and the form and thickness of the hymen is recorded. In the prepubertal girl, vaginal penetration usually results in tearing of the hymen in the posterior 180°. These lacerations may be associated with bruising or abrasions both ventrally and towards to the posterior fourchette and lateral introital tissues.

If there is a discharge, the character, consistency, and color should be noted. The presence of any odor should also be recorded. If there is evidence of infection, dry smears for bacteriologic studies, cultures, and wet slide preparations should be prepared. Fresh wet smears must be examined for *Trichomonas vaginalis*, clue cells, and *Candida albicans*. The hymen is sensitive and when cultures are taken, care should be taken to pass the culture swab beyond the hymen to a less sensitive area(25-30). The findings in the abused female child are detailed in ***Table* I**.

Clinical examination of the anus is often disappointing in the sense, first, that little is to be found and, secondly, that the correct interpretation of abnormalities remains a matter of serious debate. Genital injuries or abnormalities are more often recognized as possible signs of abuse, while anal and perianal injuries may be dismissed as being associated with common bowel disorders such as constipation or diarrhea. Both the anal sphincter and the anal canal are elastic and allow for dilatation. Digital penetration usually does not leave a tear of the anal mucosa or of the sphincter. Penetration by a larger object may result in injury varying from a little swelling of the anal verge to gross tearing of the sphincter, or even bowel perforation. If lubrication is used and the sphincter is relaxed, perhaps no physical evidence will be found. Even penetration by an adult penis can occur without significant injury. After penetration, sphincter laxity, swelling, and small mucosal tears of the anal verge may be observed as well as sphincter spasm. Within a few days the swelling subsides and the mucosal tears heal. Skin tags can form because of the tears. Repeated anal penetration over a long period may cause a loose anal sphincter and an enlarged opening(27,30,31). The findings from the anus in a sexually abused child are detailed in ***Table* II**.

ANOGENITAL EXAMINATION OF THE MALE CHILD VICTIM

A genital examination of boys may be performed with the patient in the sitting, supine or standing position. The physician should examine the penis, testicles and perineum for bite marks, abrasions, bruising or suction ecchymoses. Evaluation of the anus may be performed with the patient in the supine, lateral recumbent or prone position with gentle retraction of the gluteal folds. The anal examination of the male is the same as in the female(26,27).

NORMAL PHYSICAL EXAMINATION FINDINGS IN A SEXUALLY ABUSED CHILD

Most children reporting that their genitalia have been subjected to sexual contact, from touching by hand even up to full penetrative sexual intercourse, show no evidence of old or fresh injuries to the genitalia area. There are several reasons for this paucity of

TABLE I FINDINGS FROM THE GENITALIA IN THE SEXUALLY ABUSED FEMALE CHILD

1. Erythema, inflammation and increased vascularity: The examiner may see redness of the skin or mucous membranes due to congestion of the capillaries.
2. Labial adhesions: Adherent of fused labia majora is seen posteriorly as a thin central line of fusion.
3. Hymenal or vaginal tears: Deep breaks in the mucosa of the vagina and hymen are called tears
4. Vaginal secretions
5. Fissures, new or healed lacerations
6. Enlarged hymenal introital opening**:** It has been postulated that the transverse diameter of the introitus is an infallible guide to whether or not penetration has occurred, the critical figure being 4 mm.

TABLE II FINDINGS FROM THE ANUS IN THE SEXUALLY ABUSED CHILD

1. Perianal erythema: Reddening of the skin overlying the perineum as well the inner aspects of the thighs and labia generally indicates that there has been intercrural intercourse (penis between the legs and laid along the perineum).
2. Swelling of the perianal tissues: Circumferential perianal swelling appears as a thickened ring around the anus. It is an acute sign and can reflect traumatic edema
3. Laxity and reduced tone of the anal sphincter: Sphincter tone should be assessed by exerting gentle traction on the sphincter. While some doctors prefer digital examination when assessing children who have been abused and anally penetrated, it would seem unwise to access anal sphincter tone by digital penetration
4. Fissures: Breaks in the skin and mucosal covering of the rectum, anus, and anal skin occur because of the overstretching and of the frictional force exerted on the tissues
5. Large tears: Large breaks in the skin extending into the anal canal or across the perineum are usually painful and can cause anal spasm. Tears often heal with scarring and leave a skin tag at the site of the trauma
6. Skin changes: The skin appears smooth, pink, and shiny, with a loss of normal fold pattern. The presence of these skin changes suggests chronicity of abuse
7. Hematoma and/or bruising: Subcutaneous accumulation of old and new blood and bruising are strong indicators of trauma. It would be very unlikely for these to occur without a history to explain them. These injuries are not likely to be accidental
8. Venous congestion
9. Pigmentation
10. Anal dilatation

diagnostic findings. For one thing, children are naturally reticent about reporting such conduct, so the opportunity to see and record acute changes is lost, for another, children are rarely subjected to great violence because a pedophile intenting on maintaining access to a child is careful to avoid attracting attention thereby. Many types of sexual molestation do not involve penetration and do not leave physical findings. In addition, a significant number of incidents occur without ejaculation or damage to the hymen. The anal sphincter is pliant and, with care and lubrication, can easily allow passage of a penis or an object of comparable diameter without injury. The hymen is elastic, and penetration by a finger or penis, especially in an older child, may cause no injury or may only enlarge the hymenal opening(32).

EVIDENCE SAMPLING FOR LABORATORY EXAMINATIONS

Forensic studies should be performed when the examination occurs within 72 hours of acute sexual assault or sexual abuse. Clothing and any material adhering to the skin such as fibers and vegetation should be preserved. Forensic science techniques provide corroborative evidence when, for example, pubic hair is found between the buttocks of a prepubertal child. When relevant swabbings of the mouth, anus or vagina are taken, they should be allowed to dry in the atmosphere before being sealed. The swabs themselves should consist of plain cotton wool. Albumen treated fibres interfere with serological investigations, so they should be avoided. Samples of semen or salivary staining on the skin are taken by applying a lightly moistened swab and treating it in the same way.

Obviously the most important identifying element for the examiner and the pathologist is the documented presence of an ejaculate, so that the retrieval of the spermatozoa is more critical than ever. It should be stressed that the lack of evidence of ejaculation by no means refutes a complaint of sexual assault. Many of the men convicted for sexual assault may suffer from some form of sexual dysfunction that impaires their ability to ejaculate. Evidence should be stored securely and a written record should be kept establishing the chain of evidence.

If the abuse has occurred within the last 72 hours,

the presence of sperm should be investigated. The survival time of sperm is shortened in prepubertal girls because of lack of cervical mucus. Spermatozoa have rarely been detected in vaginal secretions from postpubertal rape victims longer than 12 hours. A Wood's lamp helps identify sperm on the clothing or skin. However, sperm is not the only substance that fluoresces under Wood's lamp, so fluorescence is a nonspecific finding. Wood's lamp is not a sensitive screening tool and should be used with caution(33). Detection of acid phosphatase is another technique used to detect semen, acid phosphatase can, however, normally be found in very low levels in the adult female vagina, so quantification of the enzyme is important to verify ejaculation. The p30 protein is a semen glycoprotein of prostatic origin. The p30-enzyme is linked with an immunosorbent assay. This protein is semen-specific and is not found in vaginal fluids. It is thus a more sensitive and specific method of semen detection(34).

For the assailant identification, various characteristics of head and pubic hair can be explored to help narrow the pool of possible assailants. Identification of genetic markers in blood, saliva and serum (ABO typing and other blood enzyme systems) should be performed within 72 hours of acute sexual assault or sexual abuse. DNA fingerprinting can, nowadays, establish the identity of a perpetrator with a high degree of certainty(35).

Finally, toxicological analysis of blood and urine should also performed in case that the child has been abused while under the influence of drugs(36-38), as well pregnancy test when about girls of reproductive age(13).

Sexually Transmitted Diseases

The diagnosis of sexually transmitted diseases (STD) is important not only to the care of the victim but also in determining the fact of sexual contact. This evidence may be prima facie, or confirmatory. Transmission of sexually transmitted diseases outside the perinatal period by nonsexual means is rare. Gonorrhea or syphilis infections are diagnostic of sexual abuse after perinatal transmission has been ruled out(38). Herpes type 2, *Chlamydia, Trichomonas,* and condyloma infections are extremely unlikely to be due to anything but abuse, particularly in children beyond infancy(39).

CONCLUSIONS

The diagnosis of child sexual abuse often can be made based on a child's history. Physical examination alone is infrequently diagnostic without the history and/or some specific laboratory findings. The duty of the doctor is to interpret trauma, collect specimens, treat injury and above all, help and support the vulnerable patient. It is not part of a medical practitioner's remit to assess guilt, comment on anyone's truthfulness or state whether or not a crime has been committed; all of these are in the province of the court. Injuries often speak for themselves and are usually more eloquent for being allowed to do so.

Close adherence to protocols and procedures that preserve the integrity of medical records, meticulus documentation and all clinical and forensic science evidence gathered can only enhance the value of medical evaluation of sexual violence. Attention to detail will benefit the patient by improving the identification of trauma, providing better prophylaxis for pregnancy and infection, and ensuring more effective investigation and prosecution of the assailant.

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