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Patterns of accidental genital trauma in young girls and indications for operative management

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Abstract

Background/purpose: The aim of this study was to define the injury patterns of accidental genital trauma (AGT) in female patients and examine the indications and outcomes of operative intervention.

Methods: Review of patients younger than 16 years with AGT from 1980 to 2007 excluding sexual- and obstetric-related injuries.

Results: One hundred sixty-seven patients met the criteria. Mean (±SEM) age was 6.9 (0.2) years. There were 70.5% straddle injuries, followed by nonstraddle blunt injuries (23.5%) and penetrating injuries (6.0%). Injuries to the labia were most frequent (64.0%). Injuries to the posterior fourchette (7.8%) and hymenal disruption (8.4%) were less frequent. There was 87.9% of AGT that was managed expectantly without further sequelae. Twenty patients (12.1%) were managed operatively. Penetrating injuries were more likely to require operative management ($P \leq .03$). The operative group was also more likely to have multiple genital injuries (60% versus 25%, $P < .01$). Proctoscopy, vaginoscopy, and/or cystoscopy were performed in 55% of patients in the operative group.

Conclusions: Accidental genital trauma is most commonly caused by straddle-type injuries and is usually amenable to nonoperative management. Hymenal disruption and injuries to the posterior fourchette are uncommon with these types of injuries.

Genital injuries in young girls raise concern regarding sexual abuse, and the literature characterizing these injuries has focused on abuse-related causes. However, similar injuries may occur during accidental circumstances, although this scenario is less frequent [1-5]. Because of the relatively low occurrence of accidental genital injuries in this patient population, the literature is deficient in characterizing the findings that are indicative of accidental genital trauma (AGT). This is significant because the existing data indicate that injuries seen with AGT may be distinct by the pattern of injury (specifically hymenal disruption and injuries to the posterior fourchette being more frequent with sexual trauma). This may alter the surgical approach in this subset of patients as well as indicate the need for further investigation into the true mechanism of injury [1,4-6].

Our aim with this review was (*a*) to examine our institutional experience with the management of AGT to

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better characterize the mechanisms of injury, the anatomic findings, and associated injuries and (*b*) to determine the role of operative intervention in these young patients.

1. Methods

With institutional review board approval, we queried the Mayo Clinic Rochester surgical and medical databases from 1980 through 2007 and identified all female patients 16 years or younger treated for genital trauma defined as injuries to the labia, vulva, urethra, vagina, hymen, perineum, or rectum. Each medical record was then reviewed to obtain patient demographics, the reported mechanism of injury, presentation, physical findings, management, and outcomes. Patients with sexually related injuries (consensual or abuse) or obstetric injuries were excluded from the study. The mechanism of injury was classified as either straddle, nonstraddle blunt, or penetrating. Straddle injury was differentiated from nonstraddle blunt injuries as those mechanisms involving a patient fall with a subsequent injury resulting from a blunt object between the legs. Nonstraddle blunt included genital injury not associated with a fall onto a blunt object (ie, being struck by a ball).

Statistical analysis was performed using JMP software (SAS Institute, Cary, NC). Continuous variables were compared between groups using the Student's paired *t* test. Discrete variables were compared with either χ^2 or Fisher's Exact tests when appropriate. Statistical significance was defined as $P \leq .05$.

2. Results

We identified 167 young girls who met the criteria for AGT. The mean age was 6.9 years (range, 1-16 years). Straddle injuries were the most frequently encountered mechanism of injury accounting for 70.5% of all injuries, followed by nonstraddle blunt injuries (23.5%) and penetrating injuries (6.0%). The labia was the most frequent site of injury (64.0%) followed by the perineum (21.5%), the vulva (8.9%), the posterior fourchette (7.8%), the vagina (5.9%), and then the rectum (2.9%; Table 1). Hymenal disruption was observed in 8.4% of patients.

Most patients (87.9%) were managed nonoperatively without any further sequelae, whereas 20 patients required general anesthesia in the operating room. Seven patients (3.0%) managed expectantly did require conscious sedation in the emergency department to obtain a complete physical examination.

Patients with penetrating injuries were more likely to be managed operatively ($P < .01$), whereas patients with straddle injuries were more likely to be managed expectantly ($P = .02$; Table 1). The injury patterns were also different between the 2 groups, in that patients requiring operative intervention were more likely to have injuries involving more than just the labia (Table 1).

Table 1 Comparison of patients managed operatively to those managed nonoperatively

Operative versus nonoperative				
	Total (%), N = 167	Operative group (%), N = 20	Nonoperative group (%), N = 147	*P*
Mean age ± SEM (yr)	6.9 ± 0.2	8.8 ± 0.7	6.6 ± 0.2	.01 [a]
Mechanism				
Straddle	118 (70.5)	9 (45.0)	109 (74.1)	.02 [b]
Blunt	39 (20.5)	6 (30.0)	33 (22.5)	.3
Penetrating	10 (6.0)	5 (25.0)	5 (3.4)	<.01 [b]
Site				
Labia	107 (64.0)	12 (60.0)	95 (64.6)	.8
Perineum	36 (21.5)	8 (40.0)	28 (12.9)	.04 [b]
Vulva	15 (8.9)	8 (40.0)	7 (4.7)	<.01 [b]
Hymen	14 (8.4)	6 (30.0)	8 (5.4)	<.01 [b]
Posterior fourchette	13 (7.8)	9 (45.0)	4 (2.7)	<.01 [b]
Vagina	10 (5.9)	4 (20.0)	6 (4.1)	.02 [b]
Rectum/ Sphincter	5 (2.9)	5 (25.0)	0 (0.0)	<.01 [b]

[a] Statistically significant by *t* test.
[b] Statistically significant by χ^2 or Fisher's Exact test.

2.1. Operative group

Twenty patients (mean age, 8.8 years; range, 4-16 years) were taken to the operating room for further evaluation and management. Indications to proceed to the operating room included examination under anesthesia (n = 4) or known extensive injuries based on the initial examination in the emergency department (n = 16). However, only 1 patient going to the operating room was managed with examination only. The mechanisms and patterns of injury within the operative group are listed in Table 2. Complete injuries through the rectum were more likely to occur with penetrating trauma compared with straddle or blunt injuries (40.0 versus 0.0%, respectively; $P = .04$). Injuries were isolated to the genitourinary region in all but 1 patient sustaining a nonstraddle blunt injury, who also had bilateral femur fractures.

Despite physical examination, 55.0% of patients in the operative group required further invasive, diagnostic evaluation intraoperatively with either vaginoscopy (n = 8), cystoscopy (n = 3), and/or proctoscopy (n = 4; Table 2). Vaginoscopy was positive in 2 patients (25.0%); cystoscopy and proctoscopy were negative in all patients undergoing these respective procedures. The mechanism of injury was not associated with the need for more invasive evaluation using 1 of the aforementioned modalities. The decision to use these modalities was made intraoperatively at the surgeon's discretion. Ten patients had indwelling urinary catheters placed that were removed after a mean 1.5 days (range, 1-3 days).