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Clinical Communications

THE DIGITAL RECTAL EXAMINATION IN PEDIATRIC TRAUMA: A PILOT STUDY

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□ **Abstract—This pilot study examined the utility of a routinely performed digital rectal examination (DRE) in pediatric trauma patients. A prospective convenience sample of patients 0 to 18 years of age presenting to the pediatric emergency department of an urban level I trauma center with a history of trauma to the spine or trunk was enrolled. An abnormal DRE was defined by the presence of gross or occult blood, decreased sphincter tone, compromised integrity of the rectal vault, or a high riding prostate. We defined DRE-identifiable injuries as spinal injury, pelvic fracture, rectal or other lower intestinal injury, and urethral injury. One hundred thirty-five patients were studied; 8 patients had DRE-identifiable injuries. The sensitivity and negative predictive value of the physical examination with and without the DRE were equivalent. Routine performance of the digital rectal examination may not improve the identification of serious injury during the secondary survey in pediatric trauma patients. © 2007 Elsevier Inc.**

□ **Keywords—digital rectal exam; trauma, children; Advanced Trauma Life Support; resuscitation**

INTRODUCTION

Routine digital rectal examination (DRE) is advocated by the American College of Surgeons in its Advanced Trauma Life Support (ATLS) course (1); the DRE is considered to be an essential tool for identifying certain occult injuries. Therefore, it has become standard of practice that every pediatric trauma patient undergoes a DRE during the secondary survey segment of trauma resuscitation (2).

The purpose of the DRE is to provide an early indication of the following injuries: rectal or other lower intestinal injury, damage to the urethra, pelvic fracture, and spinal cord injury. However, there are other findings on physical examination that can identify these injuries, including the presence of gross blood per rectum or per urethra, rectal pain, perineal or scrotal hematoma, abdominal tenderness, neurological deficit, and pelvic tenderness or instability.

The rectal examination can be painful, frightening and confusing for a child, and performance of the DRE may negatively impact the physician's ability to reexamine the patient (3). It is especially important, therefore, to evaluate the usefulness of the DRE in pediatric trauma patients. A literature review from 1966 to the present using MEDLINE revealed only a few studies examining the utility of the DRE in trauma (4–7), but none involving children.

We conducted a pilot study to investigate the utility of a routinely performed digital rectal examination in the traumatized child.

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Table 1. Patient Demographics, Mechanisms of Injury and Types of Trauma (n = 135)

Characteristic	Result	
	n (%)	Mean (± SD)
Age in years		12 (± 4.43)
GCS		14 (± 2.08)
Gender		
Female	38 (28.1)	
Male	97 (71.9)	
Mechanism of injury		
Pedestrian struck	41 (30.4)	
Motor vehicle passenger	30 (22.2)	
Assault, blunt	8 (5.9)	
Assault, stab	22 (16.3)	
Assault, gunshot	7 (5.2)	
Fall, blunt	25 (18.5)	
Fall, impalement	1 (0.7)	
Sports-related	1 (0.7)	
Type of trauma		
Blunt	105 (77.8)	
Penetrating	30 (22.2)	
Glasgow Coma Scale		
3–12	7 (5.2)	
13–15	128 (94.8)	

METHODS

A prospective convenience sample of patients aged from 0 to 18 years of age with blunt or penetrating trauma to the spine or trunk evaluated in the pediatric emergency department of an urban level I trauma center was enrolled. All patients underwent a DRE by a physician experienced in performing the procedure. No patients were excluded, but every effort was made to perform the DRE before giving intravenous sedation or paralytic medications.

The treating physician recorded the mechanism of injury, results of the primary and secondary survey, as well as patient disposition. The final diagnosis was recorded after the results of all diagnostic procedures were known or at the time of the hospital discharge by a study investigator blinded to the results of the initial physical examination and the DRE.

DRE-identifiable injuries were defined as rectal or other lower intestinal injury, urethral injury, pelvic fracture, and spinal injury. Findings on the physical examination suggestive for the presence of a DRE-identifiable injury were blood per rectum or per urethra, rectal or abdominal tenderness, perineal hematoma, pelvic pain or instability, and motor or sensory deficits of the extremities. An abnormal DRE was defined by any of the following: gross or occult blood, decreased sphincter tone, compromised integrity of the rectal vault, or a high riding prostate. The utility of the DRE in detecting DRE-identifiable injuries was examined using two-sample tests of proportions. We compared the test performance characteristics of the physical examination during the secondary survey with and without the DRE. Test performance characteristics were analyzed for the entire study population and for the subset of patients with normal or only slightly depressed mental status, defined as having a Glascow Coma Scale of 13 through 15.

The study protocol was approved by the Committee on Clinical Investigations of the Albert Einstein College of Medicine and the Jacobi Medical Center.

RESULTS

One hundred thirty-five patients were enrolled. Demographic characteristics of the sample and mechanisms and types of injury are noted in Table 1. Patients ranged in age from 15 months to 17 years. The median GCS score was 15; 128 patients (95%) had a GCS of 13 to 15.

Eight patients (5.9%) had DRE-identifiable injuries (Table 2): Patients 30, 75, and 112 had lower intestinal injuries, all secondary to gun shot wounds. Patient 112 also had an associated injury to the bladder. Patients 1, 26, and 63 had fractures of the pelvis, and patients 72 and 125 had spinal cord injuries at C5/6 and T12, respectively.

Fourteen patients (10.4%) had a positive DRE. Of these, 2 (14.3%) had DRE-identifiable injuries, and 12 (85.7%) were false positive. Among these 12, 9 had occult or gross blood noted, and 3 had weak or absent

Table 2. Characteristics of Patients with "DRE-identifiable" Injuries (n = 8)

Patient	Initial GCS	Injury	Mechanism	DRE	Physical Examination
1	14	Pelvic avulsion fracture	Pedestrian struck	Negative	Negative
26	15	Pelvic fracture	Fall	Negative	Pelvic tenderness
30	15	Small bowel injury	Gun shot	Negative	Abdominal tenderness
63	15	Pelvic fracture	MVC	Negative	Pelvic tenderness
72	15	Spinal cord injury C5/6	Fall	Negative	Motor deficit
75	15	Small bowel injury	Gun shot	Negative	Abdominal tenderness
112	15	Bladder and small bowel injury	Gun shot	Occult blood	Urethral blood, abdominal tenderness
125	15	Spinal cord transsection T12	Gun shot	Weak sphincter tone	Motor deficit

DRE = digital rectal examination; MVC = motor vehicle collision; GCS = Glasgow Coma Scale.