Reasons to Omit Digital Rectal Exam in Trauma Patients: No Fingers, No Rectum, No Useful Additional Information

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Background: Performance of digital rectal examination (DRE) on all trauma patients during the secondary survey has been advocated by the Advanced Trauma Life Support course. However, there is no clear evidence of its efficacy as a diagnostic test for traumatic injury. The purpose of this study is to analyze the value of a policy mandating DRE on all trauma patients as part of the initial evaluation process and to discern whether it can routinely be omitted.

Methods: Prospective study of patients treated at a Level I trauma center. Clinical indicators other than DRE (OCI) denoting gastrointestinal bleeding (GIB), urethral disruption (UD), or spinal cord injury (SCI) were sought and correlated with DRE findings suggesting the same. Impression of the examining physician as to the need and value of DRE was also studied. Patients with a Glasgow Coma Scale Score (GCS) of 3 and pharmacologically paralyzed were excluded from the SCI analyses. UD analysis included only males.

Results: In all, 512 cases were studied (72% male, 28% female) ranging in age from 2 months to 102 years. Thirty index injuries were identified in 29 patients (6%), 17 SCI (3%), 11 GIB (2%), and 2 UD (0.4%). DRE findings agreed positively or negatively with one or more OCI of index injuries in 93% of all cases (92% seeking SCI, 90% seeking GIB, 96% seeking UD). Overall, negative predictive value of DRE was the same as that of OCI, 99% (SCI 98% versus 99%, GIB 97% versus 99%, UD both 100%). Positive predictive value for DRE was 27% and for OCI 24% (SCI 47% versus 44%, GIB 15% versus 18%, UD 33% versus 6%). Efficiency of DRE was 94% and OCI was 93%. For confirmed index injuries, indicative DRE findings were associated with 41% and OCI 73% (SCI 36% versus 79%, GIB 36% versus 73%, UD 50% versus 100%). OCIs were present in 81% of index injury cases. In all index injury cases where OCIs were absent, positive DRE findings were also absent. DRE was felt to give additional information in 5% of all cases and change management in 4%. In cases where the clinician felt DRE was definitely indicated (29%) it reportedly gave no additional information in 85% and changed management in 11%.

Conclusion: DRE is equivalent to OCI for confirming or excluding the presence of index injuries. When index injuries are demonstrated, OCI is more likely to be associated with their presence. DRE rarely provides additional accurate or useful information that changes management. Omission of DRE in virtually all trauma patients appears permissible, safe, and advantageous. Elimination of routine DRE from the secondary survey will presumably conserve time and resources, minimize unpleasant encounters, and protect patients and staff from the potential for further harm without any significant negative impact on care and outcome.

Key Words: Trauma, Rectal exam.

MATERIALS AND METHODS

This prospective study of patients treated at a Level I trauma center was approved by the Institutional Review Board of the medical center. Patients were enrolled over a one-year period beginning May 2003. All patients treated by the trauma service for acute injury during the study period were eligible for entry into the study. All initial patient care was conducted according to ATLS guidelines by postgraduate year (PGY) 4, 2, or 1 surgical residents under the direction of a trauma surgery attending. After completion of the primary and secondary survey, which included a DRE, the resident or attending staff was responsible for completing a study data collection sheet (Table 1). The actual DRE may or may not have been performed by the staff member completing the form. The form catalogued information on injury mechanism and patient condition along with specific DRE findings generally considered as being consistent with the presence of one of the index injuries. Finally, it sought information on the final diagnosis and clinician opinion regarding utility and necessity of DRE. Opinions of junior residents could be superceded by those of the PGY4 or attending.

### Table 1 Rectal Exam Study Data Sheet

<table>
<thead>
<tr>
<th>MECHANISM (circle one):</th>
<th>Blunt</th>
<th>Penetrating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspected Injuries:</td>
<td>Head/Neck</td>
<td>Thorax</td>
</tr>
<tr>
<td>Pelvic</td>
<td>Extremity</td>
<td>Multiple</td>
</tr>
</tbody>
</table>

Sedated or pharmacologically paralyzed at time of exam? ______ Y ______ N

### FINDINGS (Circle All That Apply):

- Gross Blood
- Hemoccult Positive
- High Riding Prostate
- Boggy Prostate
- Decreased Sphincter Tone
- Palpable Bony Fragment

### RELATED CLINICAL FINDINGS: (Circle All That Apply):

- Blood at Urethral Meatus
- Unstable Pelvis
- Neurologic Deficit Below Waist
- Scrotal Hematoma
- Foreign Body on Pelvis X-Ray
- Positive FAST Exam for Fluid
- Perineal Hematoma
- Pubic Diastasis
- CT Findings Consistent With GI Tract Injury
- Penetrating Abdominal Wound Below Umbilicus
- AP Compression Pelvic FX
- Hemoglobin < 13 gms
- Penetrating Flank Wound
- Vertical Shear Pelvic FX
- Peritonitis
- Penetrating Wound to Buttock
- Priapism
- Evisceration
- Penetrating Wound to Perineum
- Neurologic Deficit Above Waist
- Gross Hematuria

### Final Diagnosis:

Other diseases documented (Prostate, Non-traumatic GI, PUD, CA):

Did the rectal exam change your management? _____ YES _____ NO

How?

Did the rectal exam provide information about the patient’s injuries you could not determine from other clinical indicators? _____ YES _____ NO

Specify:

Given the patient’s clinical presentation would you have done a rectal exam if it were not part of a protocol? _____ YES _____ NO
Definitive diagnosis of index injuries was made by urethrogram, computed tomography (CT) scan, magnetic resonance imaging, laparotomy, or gastrointestinal endoscopy. A diagnosis of SCI was only assigned if cord injury was documented by a definitive test. Vertebral bony injury without associated cord injury was not categorized as a SCI.

Negative (NPV) and positive (PPV) predictive value of both DRE and OCI was calculated for all index injuries combined, and then for each individually. The efficiency, or the percentage of times that the test in question gives the correct answer compared with the total number of tests, was also calculated for both DRE and OCI. The analysis of UD was limited to males in the overall sample, but for analysis of confirmed injury did include one female. Patients with a Glasgow Coma Scale (GCS) score of 3 and those pharmacologically paralyzed were excluded from the SCI analysis.

### RESULTS

Data sheets were fully completed on 512 patients during the study period and included in the analysis. Forty-one patients were excluded from the SCI analysis due to GCS score or pharmacologic paralysis and/or intubation. The UD analysis included 371 males.

The entire study group was comprised of 72% males and 28% females ranging in age from 2 months to 102 years. Blunt mechanism accounted for 86% of all injuries. Mean Injury Severity Score (ISS) was 12. Mean GCS of all patients was 13; excluding those patients with a GCS of 3, the mean GCS was 14. Thirty index injuries were identified in 29 patients giving an incidence rate of 6%. Of the index injuries, 17 (57%) were SCI, 11 (37%) were GIB, and two (6%) were UD. This represents 3%, 2%, and 0.4% of the entire sample respectively. DRE findings agreed either positively or negatively with one or more OCI of index injury in 93% of all cases and in 92% when seeking SCI, 90% when seeking GIB, and 96% when seeking UD. Negative and positive predictive values of DRE and OCI overall, as well as stratified by each index injury, are shown in Table 2. Efficiency of DRE was 94% and for OCI it was 93%.

When considering only confirmed index injuries, indicative DRE findings were associated with 41% and OCI were associated with 73% of the 30 index injuries. For confirmed SCI, DRE findings were associated with 36% and OCI 79%. For GIB, the association was 36% versus 73% and for UD it was 50% versus 100%. OCI were present in 81% of the 29 cases with confirmed index injuries. In all index injury cases where OCI were absent, DRE findings were also absent. Agreement between OCI and DRE findings for documented index injuries was 59%. OCI missed six index injuries (three SCI and three GIB) yielding a false negative rate of 22%. DRE missed 17 index injuries (nine SCI, seven GIB, and one UD) for a false-negative rate of 63%. The accuracy rate of DRE and OCI for detecting the presence of an index injury in those patients with confirmed index injuries is displayed in Table 3.

DRE was felt to yield additional pertinent information in 5% of all cases and reportedly changed management in 4%. In cases where the clinician felt DRE was definitely indicated (29%), it reportedly gave no additional information in 85% and changed management in 11%. The additional information ascribed to DRE most commonly related to rectal tone and rectal bleeding. Purported changes in management generally involved the performance or avoidance of CT scan and/or proctoscopy.

### DISCUSSION

This study demonstrates that DRE is equivalent to OCI for confirming or excluding the presence of index injuries, and is of limited value in the initial assessment of trauma patients. DRE rarely provided additional accurate or useful information that changed patient management. Clinical acumen based on other information, short of DRE results, appears to be a safe and accurate method of ruling in, or ruling out, an index injury thereby avoiding this unpleasant encounter.

In this study, when all cases are considered, the NPV, PPV, and efficiency (which is essentially a measure of accuracy) of DRE and OCI are no different, potentially making one or the other expendable. Furthermore, in cases with confirmed index injury, the more accurate tool proved to be OCI. In all index injury cases where OCI were falsely negative, DRE was falsely negative as well. Therefore, no index injury would have been missed by omitting DRE that would also not be missed by relying on OCI alone. However, omission of DRE would have avoided acquisition of false-negative or false-positive information in 31 patients or 6% of the entire sample versus 21 or 4% for OCI. Of greater note, and perhaps clinical importance, is the significantly higher false-negative examination rate (63%) for DRE compared with OCI (22%) in patients with confirmed index injury.

Others have questioned the utility and necessity of DRE in trauma patients. Guldner and associates conducted a ret-

<table>
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<th>Table 2</th>
<th>Positive and Negative Predictive Values for Digital Rectal Examination and Other Clinical Indicators</th>
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<tr>
<td></td>
<td>DRE (NPV %)</td>
</tr>
<tr>
<td>Overall sample</td>
<td>99</td>
</tr>
<tr>
<td>Spinal cord injury</td>
<td>98</td>
</tr>
<tr>
<td>Gastrointestinal bleeding</td>
<td>97</td>
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<tr>
<td>Urethral disruption</td>
<td>100</td>
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<table>
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<tr>
<th>Table 3</th>
<th>Accuracy of Digital Rectal Examination and Other Clinical Indicators in Patients with Confirmed Index Injury</th>
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<tr>
<td></td>
<td>DRE (%)</td>
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<tr>
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<td>40</td>
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<tr>
<td>Spinal cord injury</td>
<td>36</td>
</tr>
<tr>
<td>Gastrointestinal bleeding</td>
<td>36</td>
</tr>
<tr>
<td>Urethral disruption</td>
<td>50</td>
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The digital rectal exam (DRE) is a common component of the initial evaluation of trauma patients. However, its role and reliability have been questioned due to issues such as interrater reliability and the potential for missing injuries.

Porter and Ursic's prospective study of 423 patients found that DRE influenced therapeutic decision making in only 1.2% of cases. Based on these findings, they state that DRE is unlikely to affect initial management when applied indiscriminately to all seriously injured patients.

The combined findings of this and the previously mentioned studies corroborate that a physician evaluating a trauma patient can reliably choose not to perform a DRE either because it is already known that an index injury exists from OCI, or because there is a low index of suspicion for index injury based on the high NPV of OCI. This study found that in cases of confirmed index injury where the clinician would have elected not to perform a DRE except as part of protocol, all had either indicative OCI or no positive OCI with a corresponding negative DRE. Therefore, those injuries that were missed would have been missed whether or not DRE was performed. This confirms the safety and reliability of clinical judgment with regard to the necessity of performing DRE routinely.

One factor that may contribute to the propensity of DRE to yield less than useful or accurate information is that it is generally relegated to the least experienced member of the trauma team (at least in academic centers), which is often a medical student. This may stem from the perceived menial nature of the task or a genuine effort to provide a complete educational experience. The issue of poor interrater reliability in determining normal and abnormal DRE has been raised.

Further, other investigators have found difficulty even among experienced examiners in determining normal and abnormal rectal tone as confirmed by manometry. It would appear there is no value in ever performing rectal examination in females to solely assess for urethral disruption. These patients are better served by vaginal examination. In this series, one of the urethral disruptions identified was in a female sustaining an open pelvic fracture with significant perineal soft-tissue disruption. This was diagnosed by gross vaginal/perineal examination, not DRE. DRE was performed and useful in demonstrating rectal integrity. However, supplemental sigmoidoscopy was performed, and would have been, regardless of DRE findings. This again demonstrates a lack of influence on clinical management exerted by DRE.

Another potential criticism of the study is the relatively small number of index injuries, particularly urethral disruptions, identified in the sample. This might also influence values of NPV, PPV, and accuracy, making results appear more noteworthy. The low incidence rate of index injuries in this relatively large series may also, however, speak to the issue that occurrence and severity is so low that DRE is unproductive in most cases and should be limited to only certain circumstances described previously.

Factors that have been associated with surgeons’ reluctance to treat trauma patients include medico legal risk, fear of exposure to transmissible disease, and exposure to personal violence. Although the risk of contracting transmissible diseases during a properly performed DRE is miniscule, the risk of violence and injury from combative and uncooperative patients is not insignificant.

The occurrence of violence in the emergency department setting, despite being under reported, is well described. In
one study, 36% of surgical staff and 30% of emergency department staff were assaulted.\textsuperscript{13} Verbal assaults are more common than physical assaults. The profile of both perpetrator and victim of violence fit well with the trauma patient and the physician relegated to the task of DRE, at least in academic centers. The perpetrator is usually young, male, intoxicated, or a substance abuser. Doctors are less likely to be victims than nurses, but those physicians who are victims tend to be younger and less experienced.\textsuperscript{14–15} Circumstances precipitating assault are not well described. Although DRE is never specifically implicated, one study does describe a significant correlation with “averse stimulation” of the patient.\textsuperscript{16} It would be reasonable to assume that DRE falls into that category. Although there were no documented episodes of physical assault on the examiner related to DRE in this current study, anecdotally, instances of antedated protest and verbal abuse were not uncommon. This is consistent with the cited literature.

DRE, if misunderstood or poorly performed can lead to litigation, or other administrative actions initiated as a result of complaints.\textsuperscript{17–19} A noteworthy level of emotional and physical discomfort associated with DRE has also been described,\textsuperscript{20} which may precipitate a less than optimal doctor, patient encounter, and heightened potential for the above mentioned occurrences. There are also small but not insignificant or inconsequential risks of adverse patient events associated with DRE related to rectal injury or other conditions.\textsuperscript{21} Again, although such actual or potential occurrences are rare, avoidance of even the smallest of risks seems sensible from a number of standpoints if an equivalent screening process that is less provocative can be substituted for DRE.

Finally, the argument could be made for performance of DRE as part of a complete physical examination mandated by an encounter with the health care system or even to garner a higher level of evaluation and management coding. In reality, many patients are lost to follow-up after discharge for trauma care. Also, for a number of reasons, many incidental findings are not appropriately recognized or acted upon after initial discovery in the trauma bay. In this study, there was one reported finding of an enlarged prostate. Documentation of follow-up was not found. This may be increasingly a problem at academic centers with concerns for continuity of care and transfer of pertinent information in the era of restricted resident work hours. However, some of these issues may be obviated by attention to a “tertiary” survey\textsuperscript{22} before discharge with directed DRE as indicated based on a more complete general medical history and review of systems. Other indicators may again be present to point to nontraumatic pathology, such as red cell indices suggestive of chronic anemia from peptic ulcer disease, malignancy, or other pathology.

Ultimately, the issue of DRE as part of a general health screening may be irrelevant. There is credible evidence that it does not significantly add to prostate cancer screening.\textsuperscript{23} Similarly, neither DRE or a single hemoccult test obtained during DRE, are advocated as an adequate screening strategy for colorectal cancer.\textsuperscript{24}

In conclusion, this study showed that DRE was of limited value in the initial evaluation of trauma patients. OCI were equivalent to DRE for confirming or excluding the presence of urethral disruption, spinal cord injury, or traumatic gastrointestinal injury with bleeding. When one of these types of injury was present, relevant OCI were more often present and when falsely absent, indicative DRE findings were absent as well. DRE was found to rarely provide additional, accurate, or useful information that changed management. Based on these findings, omission of DRE in virtually all trauma patients appears permissible, safe, and advantageous. Elimination of routine DRE from the secondary survey will also presumably conserve time and resources, minimize unpleasant encounters, and protect patients and staff from the potential risk of further harm without any significant negative impact on care and outcome. The developers of the ATLS course should consider recommendation of a more judicious policy of DRE performance. This should emphasize use of DRE only as an adjunct, relying on other clinical indicators and physician judgment to primarily discern the presence or absence of index injuries.

REFERENCES

\begin{enumerate}
\item Esposito TJ, Maier RV, Rivara FP, Carrio CJ. Why surgeons prefer not to care for trauma patients. \textit{Arch Surg.} 1991;126:289–297.
\item Pane GA, Winarski AM, Salness KA. Aggression directed toward emergency department staff at a university teaching hospital. \textit{Ann Emerg Med.} 1991;20:283–286.
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