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Background

- Scrotal pain infrequent ER visit but common surgical consultation
- Differential diagnosis wide
- Majority DO NOT have testicular torsion
- ER triage based on signs, symptoms and tests
Background

• Delays in appropriate treatment can be disastrous for testis/physician
• “Gold-standard” test (duplex Doppler ultrasound) imperfect and costly
• Triage using a MET system has been developed for acute abdominal pain
Purpose

- Review typical ER presentation to determine common “attributes” in diagnosis
- Develop a PDA format to allow data acquisition
- Determine if a hand-based computer digital assistant can aid in triage
Materials and methods

• Retrospective chart review
• 103 boys seen in CHEO ER with diagnosis “acute scrotal pain”
• I.C.: 1-17 years, presenting complaint “scrotal pain”, duration up to 10 days
• E.C.: pain 2nd to trauma, previous treatment, or direct Urology referral
Materials and methods

• Charts reviewed to determine “attributes” and final diagnosis
• Patients discharged to FP uncertain outcome
• If urology consult in ER or urology clinic appointment, attributes recorded compared to those of initial presentation
Materials and methods

- Data mining
- Rough sets analysis
- Shapley fuzzy measures
- Decision rules
**Management Process in ER**

- **ER physician evaluation**
  - n=103
  - Send to Urology clinic
    - 39 (37.9%)
- **Consult Urology**
  - 34 (33%)
- **Urologist evaluation**
  - n=73
    - Surgical treatment
      - TT=27
      - TDS=6
    - Medical treatment
      - AT=32
      - E=5
## Results

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Most often evaluated by the ER physician</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td>Age</td>
</tr>
<tr>
<td>2</td>
<td>PainOnset</td>
<td>Onset of pain</td>
</tr>
<tr>
<td>3</td>
<td>PainSite</td>
<td>Location of pain</td>
</tr>
<tr>
<td>4</td>
<td>PainType</td>
<td>Type of pain</td>
</tr>
<tr>
<td>5</td>
<td>Vomiting</td>
<td>Did vomiting occur?</td>
</tr>
<tr>
<td>6</td>
<td>Swelling</td>
<td>Swelling</td>
</tr>
<tr>
<td>7</td>
<td>TesTend</td>
<td>Testis tenderness</td>
</tr>
<tr>
<td>8</td>
<td>Cord</td>
<td>Cord palpable</td>
</tr>
<tr>
<td>9</td>
<td>Lie</td>
<td>Lie</td>
</tr>
<tr>
<td>10</td>
<td>Reflex</td>
<td>Cremasteric reflex</td>
</tr>
<tr>
<td>11</td>
<td>WBCC</td>
<td>White blood cell count</td>
</tr>
<tr>
<td>12</td>
<td>Tempr</td>
<td>Temperature in Celsius degrees</td>
</tr>
<tr>
<td>13</td>
<td>WBCS</td>
<td>WBCS/HPF</td>
</tr>
</tbody>
</table>
Final diagnosis (urology)

N=73

- Torsion testis: 38% (35 patients)
- Torsion-detorsion syndrome: 9.9% (7 patients)
- Appendix testis: 45.1% (33 patients)
- Infection: 7% (5 patients)
Patient: Doe, John

History:
- Site of pain: Right
- Onset of pain: Acute Grad
- Type of pain: Const Inter
- Vomiting: Yes No

Main
Site of Tenderness

Site: Posterior

Done  Clear
Patient: Doe, John

Triage:
- Clinic (strong)
- Discharge: weak
- Clinic: strong
- Consult: 1

Main
Protocol vs “Gold standard”

<table>
<thead>
<tr>
<th>Measure</th>
<th>Doppler*</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>88.9%</td>
<td>75.7%</td>
</tr>
<tr>
<td>Specificity</td>
<td>98.8%</td>
<td>76.5%</td>
</tr>
</tbody>
</table>

Discussion

• Conflicting data and certainty of “final diagnosis” problematic
• Decision generally made on set of 8 attributes
• Something missing? (other attributes, clinical acumen, experience)
• Acquisition of complete data likely improved
Conclusions

• Common attributes evaluated in boys with scrotal pain
• Protocol for computer implementation developed
• May aid in earlier triage of patients
• Initial results warrant prospective study in the ER