Implementation of a standard imaging protocol for necrotizing fasciitis at an academic center, a quality improvement project

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Disclosures

• We have no disclosures.
Background

- Necrotizing fasciitis (NF) is a rapidly progressive, often fatal soft tissue infection requiring urgent, surgical treatment.
- NF is a clinical diagnosis and frequently does not require imaging.
- Early on, clinical presentation can mimic other less aggressive soft tissue infections.
- CT or MRI provides:
  - A high negative predictive value
  - Can rule in the diagnosis when there is clinical uncertainty
  - Useful to assess for extent of disease and associated complications
Background

- Since necrotizing fasciitis is a life threatening time sensitive condition, when imaging is ordered, there should be:
  - A clear standardized protocol
  - Short turnaround times

Purpose

- To implement a standardized protocol for expediting imaging and reporting of cross-sectional imaging of patients with suspected necrotizing fasciitis.
Methods

• Retrospective review of the utilization of cross sectional imaging, CT and MRI, for indication of necrotizing fasciitis over a 1 year period.
• CT and MRI reports were vetted using an internal report search tool looking for term ‘necrotizing fasciitis’ anywhere in the report.
• Assessed the results of the imaging findings of these exams in comparison with the final clinical diagnosis of the patient on discharge summary.
• Quantitatively analyzed the turnaround times from when study was ordered until preliminary report and final report and if applicable, time to surgical treatment.
Methods

• This measurable data was presented to the MSK faculty and surgery burn unit director. In conjunction and with the support of the burn unit, a streamlined, consistent protocol (CT with contrast) was established.

• 1 page document was circulated through the radiology department and placed on internal website with the protocol as well as education and references for imaging findings of necrotizing fasciitis. Importance of turn around time was stressed.

• CT techs were also educated on importance of turn around times.
Methods

• 1 year after institution of the standardized protocol, retrospective review of the utilization of cross sectional imaging of necrotizing fasciitis was again performed using same parameters.
Results

- Prior to standard protocol, CT and MRI were utilized equally (9 CT, 9 MRI) for necrotizing fasciitis with equally high negative predictive values.

- 1 year review after institution of standard protocol, utilization was increased (24 CT, 8 MRI) for necrotizing fasciitis with similar high negative predictive values.

- Turn around times from order to completion and from order to report improved after standard protocol and are summarized in chart.
## Results

<table>
<thead>
<tr>
<th>Table 1: Imaging findings and clinical outcomes</th>
<th>True Positive</th>
<th>False Negative</th>
<th>True Negative</th>
<th>False positive</th>
<th>Non specific fascial thickening. Necrotizing fasciitis not excluded on imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before standard protocol</td>
<td>CT</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>After standard protocol</td>
<td>CT</td>
<td>5</td>
<td>1*</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Before standard protocol</td>
<td>MRI</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>After standard protocol</td>
<td>MRI</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

*Patient had been taken to OR twice previously for surgical debridement for necrotizing fasciitis. CT was performed to re-evaluate for extent and was unable to distinguish between postsurgical changes from necrotic tissue. Patient was taken to OR a 3rd time for debridement.*
Results

TURN AROUND TIMES

<table>
<thead>
<tr>
<th>MINUTES</th>
<th>Avg time from order to completion for CT</th>
<th>Avg time from order to report for CT</th>
<th>Avg time from order to completion for MRI</th>
<th>Avg time from order to report for MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before protocol</td>
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Before protocol

Average times:
- CT: 0 to 200 minutes
- MRI: 300 to 500 minutes

After protocol

Average times:
- CT: 200 to 700 minutes
- MRI: 700 to 900 minutes
Conclusions

• Necrotizing fasciitis can be a difficult condition to diagnose clinically. Cross sectional imaging can be helpful with initial exclusion and diagnosis of other less severe soft tissue infections as well as diagnosis of necrotizing fasciitis in uncertain cases.
Conclusions

• In a busy academic center such as the University of Utah, where residents as well as non MSK faculty and fellows are often interpreting emergent MSK studies after hours, we found CT to be much more efficient than MRI for imaging of necrotizing fasciitis while still preserving accuracy.
References


