A Novel MRI Technique to Improve Standards of Care for Query Cauda Equina

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Background

Cauda Equina syndrome is an absolute indication for emergency surgical decompression. An emergency MRI is needed for diagnosis and a delay in obtaining this can lead to permanent disability for the patient.

However, the vast majority of patients that undergo an MRI do not have Cauda Equina Syndrome and there is a significant burden on Radiology departments. To reduce the workload and improve access to imaging, a shorter limited Lumbar Spine MRI examination consisting of only T2 sagittal and axial sequences was introduced, replacing T1 and T2 sagittal and axial sequences, reducing the number of sequences from 4 to 2. We hypothesised that all cases of cauda equina compression would be diagnosed even with a limited sequence. A limited 1.5 or 3T MRI examination took approximately 8 to 12 minutes compared to 15 to 25 minutes for a standard protocol MRI.

The aim of this Audit was to assess the safety and impact of a limited, reduced sequence MRI on patients with suspected Cauda Equina compression and to improve access to MRI imaging.

Standards

British Association of Spine Surgeons standards of care for CES:
“An MRI should be undertaken as an emergency and it is very difficult to justify waiting until the end of an elective MRI list”

Indicator

1. Percentage of MRIs performed within 1 hour and 4 hours of request being made
2. Average time spent in MRI
3. Average time in Hospital

Target

1. Improve the number of patients receiving an MRI within 4 hours.
2. Reduce the time spent in MRI

Methodology

1st audit round: Patients admitted between April 2017 - August 2017 with suspected CES were reviewed.

2nd audit round: Patients that underwent the new MRI protocol and admitted from Sept 2017 to July 2018 were reviewed.

Exclusion Criteria: Patients with a known malignancy, non orthopaedic patients and patients over 65 years old.

Each average bed stay cost approximately £222 per day as per NICE Guidelines (NG27)

The images shows sagittal T2 and axial T2 with cauda equina compression at L4/S due to a large disc herniation.

Results

<table>
<thead>
<tr>
<th>Audit Cycle 1</th>
<th>Audit Cycle 2</th>
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<tbody>
<tr>
<td>Number of patients: 64</td>
<td>Number of patients: 115</td>
</tr>
<tr>
<td>Time: April 2017 to August 2017</td>
<td>Time: Sept 2017 to July 2017</td>
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<tr>
<td>Results</td>
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<tr>
<td>MRI performed within 1 hour (%) : 6.25</td>
<td>MRI performed within 1 hour (%) : 23.8</td>
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<tr>
<td>MRI performed within 4 hours (%) : 65.56</td>
<td>MRI performed within 4 hours (%) : 84.3</td>
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<td>Number of Patients with CES : 3</td>
<td>Number of Patients with CES : 5</td>
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<td>Average time in MRI (mins): 19.70.</td>
<td>Average time in MRI (mins): 9.94</td>
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<td>Average time in Hospital = 2.95 days</td>
<td>Average time in Hospital = 1.94 days</td>
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<tr>
<td>% Discharge in 24 hours = 29.69%</td>
<td>% Discharge in 24 hours = 41.74%</td>
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Action Plan

1. Implementation of a novel limited sequence LS MRI Protocol that is quicker to perform in September 2017.
2. Follow up of the same cohort of patients in 6 months time to assess if any pathology has been missed

Conclusions

1) Significant reduction (p<0.01) in time to obtain an MRI
2) Significant increase (p<0.05) in discharge within 24 hours from 29.69% to 41.74%
3) Time in spent in MRI has fallen from 19.70 minutes to 9.94 minutes on average.
4) No cases of Cauda Equina missed with new MRI protocol
5) Approximate savings of £34,410 during 2nd Audit period

References

3. Implementing the NICE guideline on Transition between inpatient hospital settings and community or care home settings for adults with social care needs (NG27). Available from: www.nice.org.uk/guidance/ng27/resources/costing-statement-218724969

The images shows sagittal T2 and axial T2 with cauda equina compression at L4/S due to a large disc herniation.