Opioid Usage and Clinical Outcomes After Minimally Invasive Surgery (MIS) Versus Open Lumbar Fusions

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Opioid Usage and Clinical Outcomes After Minimally Invasive Surgery (MIS) Versus Open Lumbar Fusions

Introduction:
Minimally invasive (MIS) lumbar fusion surgery continues to gain popularity with promising clinical results, such as better functional mobility, and decreased hospital stay. As being opioid-naive has been described as a protective risk factor for postoperative opioid consumption, the objective of this study is to determine the differences in long-term opioid usage between Minimally Invasive Transforaminal Lumbar Interbody Fusion (MIS TLIF) versus traditional open lumbar interbody fusions. We hypothesize that patients undergoing MIS surgery will have a greater degree of pain control compared to open surgical cases.

Methods:
All lumbar fusion surgeries performed between 2019 and 2021 were reviewed independently for opioid morphine milliequivalent (MME) requirements from 6 months pre-operatively to 1 year post-operatively. The Michigan Spine Surgery Improvement Collaborative (MSSIC) was utilized for all patient outcomes.

Results:
Of the 292 patients included, 71 patients had MIS-TLIF while 221 patients underwent open lumbar interbody fusions. 66 (23%) had at least one opioid prescription 6-12 months post-surgery. There were no differences in opioid prescription rates between the two groups. Among patients with an opioid prescription, MIS-TLIF patients had lower daily MMEs when compared to open cases at 6-12 months post-surgery (p=0.048). Patients with opioid prescriptions also had higher rates of DVT, history of depression, history of anxiety, COPD, PHQ2 depression at baseline, reported pre-op daily use of opioids, longer duration of symptoms and lower baseline PROMIS physical function scores. No statistically significant differences were observed for patient satisfaction at 1 & 2 years or MCID PROMIS at 90 days and 1 year after surgery. Length-of-surgery, estimated blood loss, and length-of-hospital stay were significantly lower for MIS TLIF compared to open surgery.

Conclusion:
Although there were no differences in opioid prescription rates, the daily opioid consumption of 6-12 months after surgery was lower for MIS-TLIF cases. There were no differences in long-term functional outcomes between open and MIS-TLIF surgeries.
Figure 1. Opioid prescription rate between MIS-TLIF and Open lumbar fusions. No statistically significant difference was observed between the two groups.

<table>
<thead>
<tr>
<th>Time</th>
<th>MIS</th>
<th>Open</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Median</td>
<td>IQR</td>
</tr>
<tr>
<td>Pre-op 3-6 months</td>
<td>22</td>
<td>0.34</td>
<td>0.22, 0.05</td>
</tr>
<tr>
<td>Pre-op 0-3 months</td>
<td>30</td>
<td>0.25</td>
<td>0.17, 0.43</td>
</tr>
<tr>
<td>Post-op 1 month</td>
<td>70</td>
<td>2</td>
<td>1, 3.125</td>
</tr>
<tr>
<td>Post-op 1-3 months</td>
<td>26</td>
<td>0.7</td>
<td>0.33, 1.17</td>
</tr>
<tr>
<td>Post-op 3-6 months</td>
<td>17</td>
<td>0.47</td>
<td>0.21, 0.67</td>
</tr>
<tr>
<td>Post-op 6-12 months</td>
<td>11</td>
<td>0.17</td>
<td>0.15, 0.25</td>
</tr>
</tbody>
</table>

Table 1. Comparing daily MME between MIS-TLIF and Open lumbar fusion surgeries for patients with an Opioid prescription at various peri-operative periods. The number of patients, median MME and interquartile range was noted.
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