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Introduction:
Muscle wasting is a common consequence of disuse and inflammation during admission to intensive care with critical illness. Limb muscles are known to decrease in size during critical illness, but less is known about muscles of the trunk. In this study, we tracked how psoas muscle area changes at multiple levels, in a group of patients with acute severe pancreatitis.

Methods:
Paired computed tomography (CT) scans were obtained from 21 patients admitted to the Royal Liverpool University Hospital’s ICU with acute severe pancreatitis. The first scan was within 3 days of admission, and the second took place between 8 to 16 days later. For each scan, three slices were identified: the top and bottom plates of L4, and the mid-point of L4 vertebral body. On each slice, the cross sectional area (CSA) of the left and right psoas muscle was calculated using ImageJ. The difference and percentage change in CSA between both scans was calculated. White cell counts and C-reactive protein results were obtained, with peak levels correlated against change in muscle size.

Results:
Combined CSA of the left and right psoas muscle increased from top to bottom plates and was positively correlated with height (r=0.74, p<0.001 mid L4 level)) and weight (r=0.57, p=0.014, mid L4 level) at all three levels. At all three levels, there were significant losses of CSA between the two scans (see table 1). CRP was moderately correlated with percentage change in CSA (r= -0.55, p=0.014). Increasing weight on admission was associated with greater percentage losses in CSA (r= -0.78, p<0.001). WCC did not correlate with change in size.

Conclusion:
In critical ill patients with acute severe pancreatitis, there are significant losses in both psoas muscles throughout the L4 level. Further prospective studies are required to determine if inflammatory markers and cytokines have a role in these losses, and to determine the functional effects of these losses.

Table 1:

<table>
<thead>
<tr>
<th>Level</th>
<th>Mean change in CSA (%) [SD]</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper plate of L4</td>
<td>-13.98 [11.83]</td>
<td>-19.36 to -8.60</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mid L4</td>
<td>-10.14 [6.07]</td>
<td>-13.07 to -7.21</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Lower plate of L4</td>
<td>-11.21 [5.70]</td>
<td>-13.96 to -8.46</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Percentage change in psoas muscle cross sectional area at three different levels