Classification scheme for acute/chronic vertebral osteomyelitis to be applied during post-mortem inspection of swine carcasses – a suggestion

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VERTEBRAL OSTEOMYELITIS (VO)

- Vertebral Osteomyelitis (VO), is the main cause of condemnation of slaughtered finishing pigs in Portugal.

- **Inflammation** of the vertebrae bone with involvement of medulla

- **Suppurative** and disfiguring process characterized by necrosis and removal of bone ...

- Compensatory production of new bone, circumscribing the lesion ... over a prolonged period (Doige and Weisbrode, 2001)
• During meat inspection, it is of major relevance to classify a lesion into acute or chronic in order to properly evaluate if meat can be declared fit or unfit for human consumption (Ninios 2014, Collins and Huey, 2015 and Jensen et al., 2017), being acute cases more related to generalised disease, like septicemia
  • EU meat inspection legislation (EU Implementing Regulation (EU) 2019/627)

• PORTUGAL
  • Due to the lack of objective criteria for VO judgment during post-mortem inspection, and the perceived risk that VO are related to septicaemia, most of VO cases are totally condemned in an undifferentiated way.
OBJECTIVE

• To establish a classification scheme to differentiate between acute and chronic VO using macroscopic characteristics (seen during post-mortem inspection) and validate it based with histopathological analyses (Gold standard method)
• MACROSCOPIC Classification, based on the following objective macroscopic characteristics
  • Acute: Shiny and moist with, sometimes, congested areas. Evident bone destruction not circumscribed by adjacent remodelling tissue; presence of fluid purulent exudate;
  • Chronic: Moderate bone destruction circumscribed by remodelling tissue; thickened exudate. No evidence of congested areas

• HISTOPATHOLOGICAL analyses (golden standard), validate macroscopic classification

• Kappa test - Interrater agreement between macroscopic and histopathological VO classification
MATERIAL AND METHODS – 40 VO cases

• **MACROSCOPIC** Classification, based on the following objective macroscopic characteristics

  **Acute**: Shiny and moist with, sometimes, congested areas (→); Evident bone destruction not circumscribed by adjacent remodelling tissue; presence of fluid purulent exudate;

  **Chronic**: Moderate bone destruction circumscribed by remodelling tissue (→); thickened exudate. No evidence of congested areas
RESULTS

• Macroscopic classification: 20 Acute / 20 Chronic

• Histopathological analyses: 18 Acute / 22 Chronic

• Macroscopic classification presented a substantial agreement (Cohen's kappa coefficient ($\kappa$) = 0.80) with histopathological classification (Gold standard method)

<table>
<thead>
<tr>
<th>Macroscopic classification</th>
<th>Histopathology classification</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acute</td>
<td>Chronic</td>
</tr>
<tr>
<td>Acute</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>Chronic</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>22</td>
</tr>
</tbody>
</table>
CONCLUSIONS

• Indicate Acute/Chronic Macroscopic Classification Scheme as a **reliable** post-mortem inspection **tool**
• First science-based VO classification scheme can contribute to **harmonize** the classification of VO and meat inspection decisions in Portuguese abattoirs.
• Extreme importance in Portugal since VO it is the **main cause of condemnation of finishing pigs at slaughterhouse** (0.1% of the slaughtered pigs)
  • Representing an **important economic issue to pork industry**
Thanks for all your attention

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