PREVALENCE OF ANIMAL TRYPANOSOMIASIS AND CORRESPONDING IMMUNE RESPONSES IN NATURALLY INFECTED CATTLE IN GULU DISTRICT

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Background

- Gulu: insurgencies for about 2 decades
- No form of vector control
- Area was deserted favoring uncontrolled vector proliferation
- Restocking of cattle by return of displaced inhabitants
Objectives

- Determine prevalence of AAT in Paicho & Lakwana (Gulu district)

- Determine cytokine responses elicited during trypanosome infection
Study area
Methodology

- Screened 1329 local cattle
- 107 positive by the HCT

<table>
<thead>
<tr>
<th>Sub county</th>
<th>No. of cattle screened</th>
<th>HCT Positives (%)</th>
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</thead>
<tbody>
<tr>
<td>Paicho</td>
<td>400</td>
<td>18 (4.5%)</td>
</tr>
<tr>
<td>Lakwana</td>
<td>929</td>
<td>89 (9.6%)</td>
</tr>
<tr>
<td>Total</td>
<td>1329</td>
<td>107 (8.1%)</td>
</tr>
</tbody>
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Prevalence = \[
\frac{\text{AAT positives}}{\text{Total}}
\]
Samples for ELISA

- 82 samples randomly selected for ELISA analysis
  - 30 +ve & 52 -ve with HCT

- Performed PCR to confirm classification and determine infecting species
  - ITS PCR (Cox et al., 2005) on 82 samples
  - 49 samples positive
  - Trypanozoon samples subjected to TgsGP- & SRA – PCR (Maina et al., 2007)

- No sample positive with either PCR
PCR results

- Mixed trypanosome species infections common

<table>
<thead>
<tr>
<th>Trypanosome spp</th>
<th>% of infections</th>
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<tbody>
<tr>
<td><em>Trypanozoon</em></td>
<td>20 (40.8%)</td>
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<tr>
<td><em>T. congolense</em></td>
<td>6 (12.2%)</td>
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<td><em>T. theileri</em></td>
<td>7 (14.2%)</td>
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<tr>
<td><em>T. simiae</em></td>
<td>22 (44.9%)</td>
</tr>
<tr>
<td><em>T. vivax</em></td>
<td>4 (8.2%)</td>
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<tr>
<td>Mixed</td>
<td>10 (20.4%)</td>
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Objective 2

- Plasma concentrations of cytokines quantified using a commercial bovine cytokine ELISA kits (TSZ ELISA™)

- Data was categorized into;
  - AAT infected cattle & AAT non-infected cattle
  - Cattle with non-pathogenic strains & AAT non-infected
  - Cattle with pathogenic strains & non-pathogenic strains
  - Cattle with single infections & mixed infections

- Mann-Whitney U test : test statistical significance
Infected vs Non-infected

IFN-g & TNF-a were up regulated in AAT cases than in non cases (P= 0.007, 0.006 respectively)
IFN-g & TNF-a were upregulated in AAT cases with non-pathogenic strains compared to AAT non cases (P = 0.011, 0.0181 respectively).
Pathogenic Vs Non Pathogenic

No significant difference between cattle infected with pathogenic species and those with non-pathogenic species.
Discussion

- Parasitological prevalence of AAT was 8.1%
- Microscopy has low sensitivity: lowers true prevalence

- IFN-γ & IL-10 have an essential role during AAT pathology
  - IL-10 controls parasite growth thus facilitating host survival
  - IFN-γ stimulates parasite growth

- TNF-α & TGF-β seem to be of no consequence
- Cytokine levels were not dependant on infecting species or whether it was mixed or single infection
Recommendations

- Appropriate control efforts be put in place to prevent escalation of trypanosomiasis in the area.

- Further studies on cytokine profiles in naturally infected cattle on a large sample size to enable an extensive statistical analysis.
Acknowledgements

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