NEW VISTA INTO DELAYED EMESIS RESEARCH: COMPUTERIZED DETECTION OF EMETIC RESPONSE IN THE FERRET MONITORED BY TELEMETRY

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INTRODUCTION

Nausea and vomiting are common side effects of cancer chemotherapy. If early emesis can be easily investigated in ferrets by direct observation, alternative methods are required to quantify delayed emesis which is time-consuming. The aim of this work was to validate the computerized detection of the abdominal pressure changes related to retches or vomits induced by an emetic substance in the ferret.

MATERIAL & METHODS

- **Animals:** Male mustela putorius furo ferrets (Marshall Europe, 69228 Lyon, France), 1.1 – 1.3 kg body weight at the initiation of the treatment.
- **Experimental protocol:**
  - Five ferrets were implanted with telemetric device (Data Sciences International): pressure catheter placed into the abdominal cavity.
  - After one-week recovery, the ferrets were challenged with cisplatin (8 mg/kg, i.p.) and the abdominal pressure was recorded using IOX software (Emka Technologies) in unrestrained animals up to 72 hours post-challenge.
- **Data analysis:**
  - Over the 72-hour recording period, the abdominal pressure signals were first manually analyzed (i.e. evaluation of the number of retches and vomits per ferret). Because this analysis was time-consuming, the ecgAUTO software (Emka Technologies) was modified to automatically analyze the data.
  - Over the first 3 hours, the emetic response (retches and vomits) was quantified via visual detection (i.e. direct observation of the ferrets), manual analysis and computerized analysis of pressure signal.
  - The 3 methods of analysis were compared using correlation coefficient.

RESULTS

- **Correlation coefficients calculated for all ferrets over the first 3-hour recording period and per 30-, 15- and 5-minute epochs**

<table>
<thead>
<tr>
<th>Method</th>
<th>Per 30 min</th>
<th>Per 15 min</th>
<th>Per 5 min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual vs visual detection</td>
<td>0.9994</td>
<td>0.9852</td>
<td>0.9757</td>
</tr>
<tr>
<td>Visual vs computerized detection</td>
<td>0.9999</td>
<td>0.9757</td>
<td>0.9641</td>
</tr>
<tr>
<td>Manual vs computerized detection</td>
<td>0.9998</td>
<td>0.9981</td>
<td>0.9972</td>
</tr>
</tbody>
</table>

- Over the 72-hour recording period, manual and computerized detections were well-correlated ($r=0.9989$). The correlation coefficients calculated separately for each ferret ranged from 0.8820 to 0.9999.
- Whatever the method used (manual or computerized), cisplatin-induced emesis was divided into early (0-12h) and delayed (36-72h) phases.

CONCLUSION

These findings demonstrate that the computerized detection of the abdominal pressure change with the modified ecgAUTO software is a reliable method for measuring emetic events. This approach opens a new vista into emesis research to permit rapid, comprehensive and objective analysis of delayed emesis and to facilitate the development of new anti-emetic therapies.

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