HISTOMORPHOMETRIC STUDIES OF PANCREAS IN CASPIAN GULL

*Zahra Basir1 and Rahim Abdi2

1Department of basic Science, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz
2Department of Marine Biology, Faculty of Marine Science, Khorramshahr University of Marine Science and Technology

*Author for Correspondence

ABSTRACT

Based on our studies there are many studies about anatomy of the alimentary tract of many other birds but, a little paper has been published about the pancreas of sea gull. Five adult male and female have been coast from Persian Gulf in south of Iran. After weighting, routine procedures of preparation of tissues were followed and the paraffin blocks were cut at 6 microns, stained with H&E and PAS and studied under light microscope. The pancreas of Caspian Gull had three lobes. Most of acini was round to oval in shape with large granules. Ducts in exocrine part had simple to stratified cuboidal epithelium with muscular layer around and without any gland. In dorsal lobe, A islets were more than B islets and in ventral lobe, B islets were more than A islets. B islets were composed of B cells and D cells at the periphery. But A islets were composed of A cells and D cells at the center. The structure of Caspian Gull’s pancreas was similar to that of other avian species with minor differences. The results allow the understanding of the particular digestive process of this species.

Keywords: Histomorphology, Histometric, Pancreas, Caspian Gull

INTRODUCTION

The Caspian Gull has a long, slender bill, accentuated by the sloping forehead (Collinson et al., 2008; Heubeck et al., 2009). The legs, wings and neck are longer than those of the herring gull. They are scavengers and predators with a very different diet (Eaton et al., 2009). They almost feed fishtrashs but in breeding season they often eat rodents such as ground squirrels, flying some distance into the steppes to find them (Hospitaleche et al., 2009). There are many studies about anatomy of the alimentary tract of many other birds but, a little paper has been published about the pancreas of sea gull. Understanding of the anatomy of the accessory glands of alimentary tract as pancreas of this bird is important, because it is known that anatomical differences can cause significant variation in food absorption from the oral cavity in animals (Ivey and Edger, 2005). Pancreas in avian differs from other animals in being composed of two or more lobes and in containing two islet types (Gulmez, 2003). Researchers reported that there are many species differences in structure of avian pancreas. For example division of lobes, distribution of the islets in lobes, form and frequency of endocrine cells in islets and structure of ducts are the most important differences. The interest in protect and maintain of this bird for better environment is developing (Meyers and Stakebake, 2005). Such studies provide useful information in relation to medical, surgical, propagation and nutritional management of the sea birds in the best mode of procedure (Small, 2000). To the knowledge and literature of the authors, there was no published reports exist describing the normal anatomy and histology of the pancreas in Caspian Gull. Then the present study was undertaken to investigate the histomorphology and histometric of the pancreas in Caspian Gull to provide base line information.

MATERIALS AND METHODS

Five adult male and female, approximately with equal weight were bring from Persian Gulf coast in south of Iran. After examined their healthy clinically, birds were deeply anesthetized by excess ether inhalation. For anatomical studies, birds slaughter. The total length of the entire of alimentary tract was defined as
the length of the pancreas. After weighting of pancreases they were washed with distilled water and dissected. The weight and length for males and females were described separately and the data were analysed by Student’s t test (2-tailed test assuming equal variance) using Microsoft Excel (Microsoft Corporation, USA) to assess sex differences. Specimens were then kept in 10% buffered formalin for 48 hours for next histological examination. Then samples were washed in ethanol 70%, putting them into alcohol series for dehydration and clearing and then embedded in paraffin for histological studies. 5 to 6 µm thick serial sections were cut off with LEICA microtome (RM2245, Germany). Some sections were stained with haematoxylin-eosin and periodic acid schiff for histological examination according to the method Crole and Soley (2010).

RESULTS AND DISCUSSION

Results
In this present study, the Caspian Gull pancreas was found to be located between the duodenal loops and had dorsal, ventral and third lobes. The lobes had different length and width in two sexes Table (1 - 2). There was no splenic lobe in macroscopic investigation. Microscopic examination showed the pancreas was covered with a thin connective tissue which consisted of collagenous fibres and was lined by mesothelium. In paranchima two distinct populations of cells the exocrine cells that secrete enzymes into the digestive tract, and the endocrine cells, type (dark) and type (clear) islets of Langerhans, that secrete hormones into the blood were seen. Exocrine part of pancreas in Caspian Gull, supported by a thin reticular stroma, was composed of acini and numerous ducts. The acini were various forms of round to oval in shape with large granules; they had no centroacinar cell. Their ducts were different sizes with simple to stratified cuboidal epithelium. In exocrine part, endocrine parts were as islets of various sizes and shapes scattered in small groups of cells. B islets were slightly larger and more than A islets. They had no distinct borders with the exocrine parts and were more densely populated. In ventral lobe B islets and in dorsal lobe A islets were more numerous. There were B cell and a few D cells inside the light B islets and there were A cell and a few D cells inside the dark A islets figure (1-5).

Table 1: Average Weight (g) of Pancreas in CASPIAN Gull (Mean±SEM)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>4.23±0.49</td>
<td>4.67±0.67</td>
</tr>
</tbody>
</table>

Table 2: Average Measurements (mm) of Pancreas Lobes in Caspian Gull (Mean±SEM)

<table>
<thead>
<tr>
<th>Region</th>
<th>Gender</th>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsal lobe</td>
<td>Male</td>
<td>20.68±0.60</td>
<td>3.00±0.57</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>21.38±0.42</td>
<td>2.910±0.37</td>
</tr>
<tr>
<td>Ventral lobe</td>
<td>Male</td>
<td>31.30±0.84</td>
<td>2.33±0.68</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>33.29±0.34</td>
<td>3.00±0.97</td>
</tr>
<tr>
<td>Third lobe</td>
<td>Male</td>
<td>10.80±0.24</td>
<td>4.21±0.07</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9.30±0.14</td>
<td>4.11±0.17</td>
</tr>
</tbody>
</table>
Research Article

Figure 1: Photomicrograph of the Pancreas in the Caspian Gull. Exocrine Part (E), Beta islet (Beta), Alfa islet (Alfa), B cell (B), A cell (A), D cell (D) (H&E)

Figure 2: Photomicrograph of the Pancreas in the Caspian Gull. Capsule that Surrounding Tissue Around (C) (H&E)

Figure 3: Photomicrograph Showing Zymogen Granules in Exocrine Part (Z) (PAS)

Figure 4: Photomicrograph Showing an Big Inter Lobular Duct with Secretionand Cuboidal Cells in Wall (arrow) (H&E)
Discussion

This study referred that the pancreas in Caspian Gull was an accessory organ that located in association with duodenum with three lobes, this result agrees with gulmez (2003) that reported that the avian pancreas differs from other animals in being composed of two or more lobes and in containing two islet types. According to the macroscopic observations no splenic lobe was seen in pancreas of Caspian Gull, but other researchers reported this lobe in duck (Mcclish et al., 1969), chicken (Gencer et al., 2007) and goose (Gulmez et al., 2004). In our studies the third lobe in Caspian Gull was a part of the ventral lobe as in chicken (Gencer et al., 2007). Segmentation of pancreas in this birds to two of the exocrine and endocrine part was in accordance with other researchers have done on other species as homer pigeon (Batah, 2009). Also inter and intra-lobular ducts systems with no mucous cells observed in this species has been described by other researchers, such as goose (Gulmez et al., 2004). In study of endocrine and islands system there was some difference and similarity between our finding sand other researchers on other species. For example in A islet, A cells were present in all parts of the islet, however many reports illustrate that in avian pancreas these cells are in peripheral region (Mensha- Brown et al., 2000; Gulmez et al., 2004). But this was different for B cells. In B islet B cells, like other avian species (Gulmez et al., 2004; Tarakcy et al., 2005) were demonstrated in the center of the pancreatic islets. We found D cells in histological examination in pancreas in Caspian Gull. D cells in Mynah were also seen in both A and B islets (Gencer et al., 2007). However, we found a few B cells in A islets, but in some avian pancreas there were no B cells in the A islets (Gulmez et al., 2004). In the studied birds in exocrine pancreas, there were no centroacinar cells but they are present in central lumen of acini in some species that reported by Gulmez (2003). The ducts in this sea gull were similar to that observed in previous studies. In addition, many circular smooth muscles were present around it but there wasn’t any gland in its wall as in goose pancreatic duct (Pyle et al., 2011). In conclusion the structure of Caspian Gull pancreas was found to be similar to that of other avian species except few minor differences that separated it from other species.
REFERENCES


