

PATHOLOGY OF GASTRIC TUMOUR IN GOLD SPOT MULLET (*Liza parsia*) FROM PARANGIPETTAI COASTAL WATERS, SOUTHEAST COAST OF INDIA

Ramalingam Vijayakumar¹, Ayyaru Gopalakrishnan², Vijayapoopathi Singaravel² and Nooruddin Thajuddin^{1*}

¹Department of Microbiology, Bharathidasan University Tiruchirapalli-620024, Tamilnadu, India; ²Centre of Advanced Study in Marine Biology, Faculty of Marine Sciences, Annamalai University, Parangipettai-608 502, Tamilnadu, India

*Corresponding author:- nthaju2002@yahoo.com

To analysis the gastric tumour by histopathologically in gold spot mullet. Fish sample was directly collected from fishermen in Parangipettai fish landing center. The gastric tumour gross pathology, morphometric, meristic and histopathology characters were investigated. The length and weight of the female fish was 21.1 cm and 248.3 g respectively. The gross morphology showed swelling had both lateral and ventral sides were enlarged. Weight of the stomach tumour was 97.6 g. sizes ranged between 4.2 -7.9 cm in diameter. Due to the tumour infection in stomach, the internal organs were fused with intestine, spleen; liver and ovary were entirely enclosed by tumour tissue. The colour of the tumour tissue was dusty white. Histopathologies of tumour lesions were characterized by polymorphic nuclei and glandular cells point out as gastrinoma. No evidence of local invasion was observed in this case.

Keywords: *Liza parsia*, adenoma, lipoma, gastric tumour.

The viruses and non-infectious carcinogens are caused the fish tumours (Martineau Ferguson 2006). Natural fish populations have been found the tumours, almost all tissue systems, but most of these tumours are unknown etiology (Harshbarger 1977). Histopathological examination is used to assess the manifestation of diseases, which reflect the morphological structure of the cells and tissues (Yevich and Barszcz 1983). In human, the gastric tumour diagnosis is mainly based on the histological pattern (Fenoglio *et al.*, 2000). Similarly the lower animals of neoplasms are also classified based on higher animals (Hochwartner *et*

al.,2010). In fish, almost all organs have been reported the tumours (Wellings 1963). But gastric tumour related reports are meager, some reports such as in harbor porpoise, sardine and sea bass (Breuer 1983, Singaravel *et al.*,2015, Vijayakumar *et al.*, 2015). *Liza parsia* is an important fish in aquaculture this is a brackish water fish species normally available in shallow coastal waters, estuary and mangrove swamps. This study a case report and histological observation of the stomach tumour in *L. parsia* from Parangipettai coastal waters, south east coast of India.

MATERIALS AND METHODS

Study area and sample collection

The gold spot mullet was collected from the fishing boats of Parangipettai fish landing centre. The length and weight of normal and tumour infected fish was measured. Tumour infected fish was dissected and the tumour diameter was measured, weight and sex were recorded.

Histopathology

The tumour tissue was fixed in 10% neutral buffered formaldehyde solution for 24 h, the biopsies were washed with tap water and dehydrated with different grades of ethyl alcohol, cleaned with xylene and embedded in paraffin wax. Thin sections (3 µm) were cut with a rotary microtome, stained with Harris haematoxylin and counter-stained with eosin (Coolidge and Howard 1979. The stained tissues were examined under a microscope (40× magnification), and digital images of histological features were obtained using the Lucia (Laboratory Imaging, www.forensic.cz/en/products) screen measurement system.

RESULTS

Gross pathology

The tumour infected *L. parsia* was morphologically different from the normal one showed distended abdomen. The abdomen of the gastrinoma infected fish was bulged. The swelling had both lateral and ventral sides were enlarged. The length and weight of the female fish was 21.1 cm and 248.3 g respectively (Fig.1)



Figure 1 *L. parsia* infected with stomach tumour; before dissection (A), after dissection (B). Rulers show the length (cm).

Description of the tumour

Gastrinoma in *L. parsia* varied in their appearance and size. Weight of the stomach tumour was 97.6 g. Size ranged between 4.2-7.9 cm in diameter. The normal stomach weight varied between 12.2 -14.3 g. Due to the tumour infection in stomach, the internal organs were fused with intestine, spleen, liver and ovary were entirely enclosed by tumour tissue, and infected fish ovary was not mature. Instead of eggs in the sac, only liquid content was observed. The colour of the tumour tissue was dusty white. They were consistency smooth surface (Fig.2)

Histopathology

The normal stomach tissue of *L. parsia* showed the fibroblast cells mingled with moderate collagen fibers and small nuclei

cellular matrix (Fig.3A). The gastrinoma lesions showed differentiated gastric squamous hyperplasia and undifferentiated squamous with epithelioid and giant cells in the gastric mucosa. The well demarcated granuloma is made up of characteristic epithelioid cells and surrounded by dense infiltrates of inflammatory cells, tumour lesion composed hyalinised loose collagen fibres intermingled with hypocellular matrix (Fig.3B&C). The intestinal cells were together with stomach tumour enlarged cells, the cells having well defined bloated nucleus. Well differentiated matured hyperplastic adipose cells packed with large fat vacuoles, hence nuclei were found in the periphery (Fig.3D).



Figure 2. *L. parsia* infected stomach tumour (arrow) small intestine (arrowhead)

DISCUSSION

The stomach tumour infected *L. parsia* abdomen was distended. Previously, stomach tumours have been reported in harbour porpoise (*Phocoena phocoena*) (Breuer *et al.*, 1989), blue shark (*Prionace glauca*) (Borucinska and Bogicevic 2004), Sardine (*Sardinella longiceps*) (Singaravel *et al.*, 2015), and Asian sea bass (*Lates calcarifer*) (Vijayakumar *et al.*, 2015). In fish, reports on stomach tumours are meager than skin tumour, because of their distinctive appearance and imperceptible pathological nature. In parangipettai coastal waters have frequently reported the different kinds of tumours such as skin tumour (0.38%) in *S. longiceps*, and odontoma in *sphyraena barracuda*, (Gopalakrishnan *et al.*, 2011). Odontoma in *sphyraena jello* (Vijayakumar *et al.* 2014), and gastrinoma in *Lates*

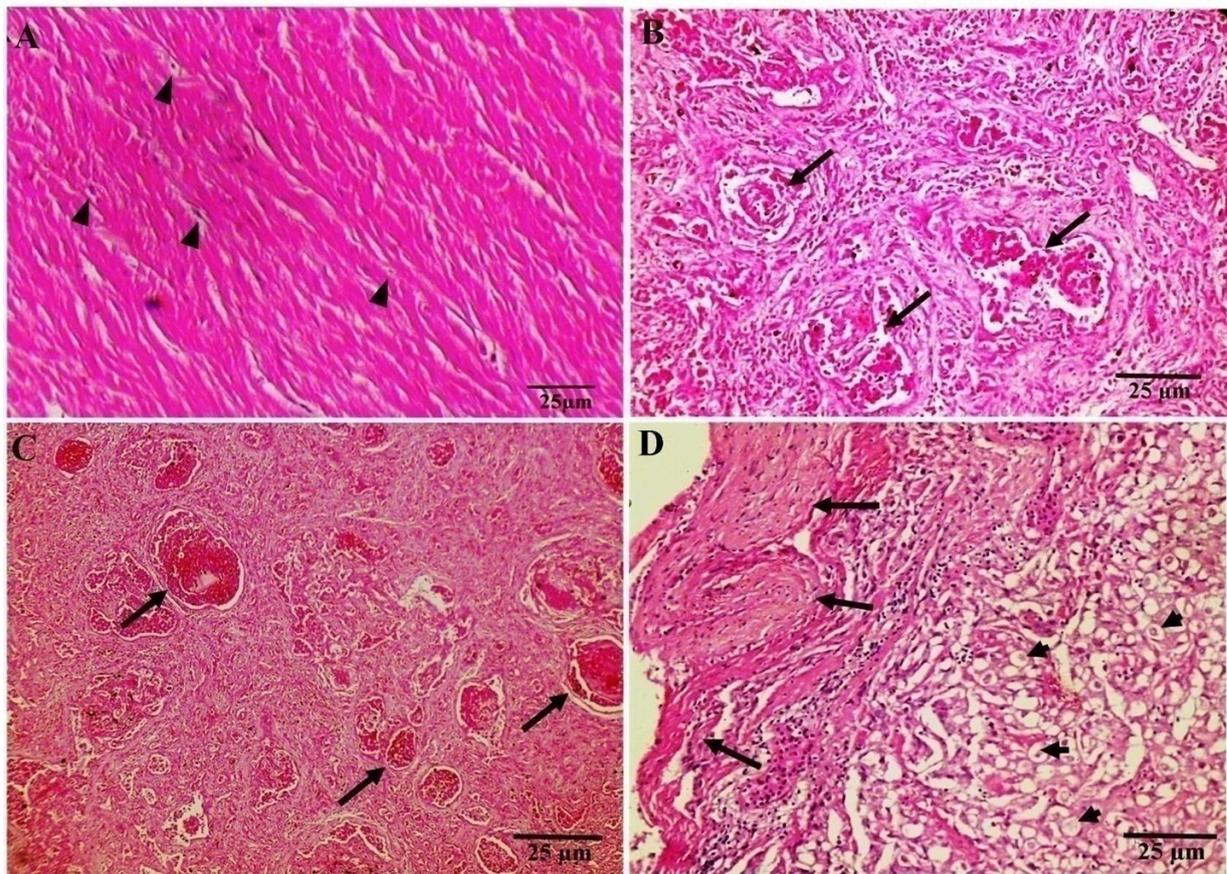


Figure 3. Cross section of normal stomach of *L.parsia* shows fibroblast cells with prominent collagen and moderated small nuclei cells (arrow head) H & E (A). High dense collagen fibre with granulomas (B and C). Cross section of intestinal tissue (large arrow) together with tumour tissue with enlarged cells (small arrow) (D).

calcarifer (Vijayakumar *et al.*, 2015), stomach tumour in *Sardinella longiceps* (Singaravel *et al.*, 2015), and neoplasia in *Mugil cephalus* (Singaravel *et al.*, 2016). In this present study also was reported gastrinoma in *L.parsia* from same coastal region.

Previously reported the tumour prevalence's were higher in monsoon season at Parangipettai coastal waters (Gopalakrishnan *et al.*, 2011, Singaravel *et al.*, 2015, Vijayakumar *et al.*, 2014). Similarly, this present study also the specimen exhibited during monsoon in Parangipettai coastal waters. Summer and post monsoon season fish landing was examined, but tumour infection was absent. The seasonal variations may influence the fluctuation of tumour prevalence and fish feeding behavior may influence. The *S. longiceps* stomach tumour varied their appearance and size, most of the tumour were white and red colour and few were reddish brown, most of multi lobed and

some of single lobed hard muscle (Singaravel *et al.*, 2015), however in this present study single tumour merged with all internal organs of fish with dusty white colour.

In this present study, histopathological observation of mullet tumour lesions consists of differentiated gastric squamous hyperplasia and undifferentiated squamous with epithelioid and giant cells in the gastric mucus and collagen fibres intermingled with hypocellular matrix. On the basis of the gross and histopathological findings the tumours were diagnosed as gastric adenoma and lipoma. The tumour infection was only observed in stomach with internal organs. No evidence of local invasion and distinct metastases were observed in these cases.

REFERENCES

1. Borucinska, J. D. & Bogicevic, T. (2004). Gastric polyp in a wild-caught blue shark. *J. Aquat. Anim. Health.*; **16**: 39-44.

2. Breuer, E. M., Krebs, B. H. & Hofmeister, R. J. (1989). Metastasizing adenocarcinoma of the stomach in a harbor porpoise, *Phocoena phocoena*. *Dis. Aquat. Organ.*; 7: 159-63.
3. Coolidge, B. & Howard, R. M. (1979). *Animal histology procedures of the Pathological Technology Section of the National Cancer Institute*, 2nd edn. *Natl. Inst. Health. Publ.*; 80-275.
4. Fenoglio, P. C., Munoz, N., Carneiro, F., Powell, S. M., Correa, P., Rugge, M., et al. (2000). Gastric carcinoma. In: Hamilton SR, Aaltonen LA, editors. *Pathology and genetics of tumours of the digestive system*. Lyon: IARC Press;: 37-6.
5. Gopalakrishnan, A., Maran, B. A., Puvanendran, V., Rajkumar, M., Balasubramanian, T. & Ferguson, H. W. (2011). Neoplasia in the Indian oil sardine, *Sardinella longiceps* (Valenciennes), and the great barracuda, *Sphyraena barracuda* (Edwards), from the south-east coast of India. *J. Fish. Dis.*; 34: 881-5.
6. Harshbarger, J. C. (1977). Role of the Registry of Tumors in Lower Animals in the study of environmental carcinogenesis in aquatic animals. *Ann NY Acad Sci.*; 298: 280-289.
7. Hochwartner, O., Loupal, G., Wildgoose, W. H. & Schmidt-Posthaus, P. H. (2010) Occurrence of spontaneous tumours of the renal proximal tubules in oscars *Astronotus ocellatus*. *Dis Aquat. Organ.*; 89: 185-9.
8. Martineau, D. & Ferguson, H. W. (2006). Neoplasia. In: *Systemic Pathology of Fish*. 2nd edn (ed. by H.W. Ferguson), pp. 313- 335. Scotian Press, London, UK.
9. Singaravel, V., Gopalakrishnan, A., Raja, K., Vijayakumar, R. & Asrafuzzaman, S. (2016) Neoplasia in flat head grey mullet, *Mugil cephalus* Linnaeus, 1758 (Perciforms: Mugilidae): two case reports of myxoinflammatory fibroblastic sarcoma and leiomyoma. *Comp. Clin.Pathol.*. DOI 10.1007/s00580-016-2295-0.
10. Singaravel, V., Gopalakrishnan, A., Vijayakumar, R. & Raja, K. (2015). Prevalance and pathology of gastric tumours in Indian oil sardine (*Sardinella longiceps*) from Parangipettai coastal waters, southeast coast of India. *J. Coast .Life. Med.*; 3(8): 592-595.
11. 10. Vijayakumar, R., Gopalakrishnan, A., Raja, K. & Sinduja, K. (2014). Occurrence of tumour (odontoma) in marine fish *Sphyraena jello* from the southeast coast of India. *Dis. Aquatic. Organ.*; 108: 53-60.
12. Vijayakumar, R., Raja, K., Singaravel, V. & Gopalakrishnan, A. (2015). Four types of neoplasms in Asian sea bass (*Lates calcarifer*). *J. Coast. Life. Med.*; 3(6): 438-40.
13. Wellings, S. R. (1969) Neoplasia and primitive vertebrate phylogeny echinoderms, prevertebrates and fishes-a review. *Natl. Cancer. Inst. Monogr.*; 31: 59-128.
14. Yevich, P. P. & Barszcz, C. A. (1983) Histopathology as a monitor for marine pollution. Results of the histopathologic examination of the animals collected for the 1976 Mussel Watch Program. *Rapp P-V Reun. Cons. Int. Explor. Mer.*; 182: 96-102.