

## A cartilaginous choristoma in a pig liver: a case report

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**ABSTRACT:** Choristomas are small aggregates of normal tissue components in aberrant locations, and may be mistaken for true neoplasms. We report a case of an incidentally found mature cartilage island in the portal tract of a two-month old piglet. All other examined organs were normal. The pig belonged to the control group of animals in a short-term experiment, was fed with wheat and corn, and did not receive any external or internal treatment. To the best of our knowledge, this is the first case of a mature cartilaginous choristoma in pig liver.

**Keywords:** cartilage; choristoma; liver; microscopy; swine

A choristoma is a benign tumour-like mass consisting of normal tissue in an abnormal site. There are only a few published cases of aberrant tissue in the liver parenchyma of various animals and rare cases have been reported in humans. Pancreatic choristoma has been most frequently described and has been reported in cats, dogs, monkeys and other animals. There have been cases of pancreatic tissue found in the liver of rats (Barron 1970) or in the duodenal submucosa, in the stomach, Meckel's diverticulum in rabbits, horses, pigs and humans (Briziarelli and Tornaben 1972). Epithelial and pancreatic choristomas were found in bovine lymph nodes at various locations (Quesada et al. 2010). Spleen tissue was reported in a dog liver (Knostman et al. 2003; Pavarini et al. 2010) and swine liver (Tanimoto and Ohtsuki 1993).

### Case description

The experiment was designed to study the possible effects of various types of food on the tissue morphology of the gastrointestinal tract. The whole experiment was approved by the Ethical Committee

for animal experiments of the University of Novi Sad, Serbia. Animals were kept, fed and sacrificed according to the standards recommended and accepted by the Animal Welfare Law of the Republic of Serbia and Animal Research Regulations of the University of Novi Sad. The autopsies were performed on random animals from the study group fed with different foodstuffs over different time periods (one month, two months, and three months).

A total of 12 sows were examined with clinical suspicion of anaemia. Each sow which had farrowed together with piglets was taken for experiment, and the animals divided into four groups of 10 animals. Each group of piglets originated from three sows. Every group was fed with a different type of food from the fifth day of life, and the fourth group was the control group fed only with wheat and corn mixture.

After autopsy, samples were taken from pig gastrointestinal organs (stomach, duodenum, jejunum, ileum, liver and pancreas). The standard procedure included fixation with neutral 10% formalin, embedding in paraffin, five to 10 histological cuts of five micrometers, and staining with haematoxylin and eosin. The organs were analysed using light microscopy.

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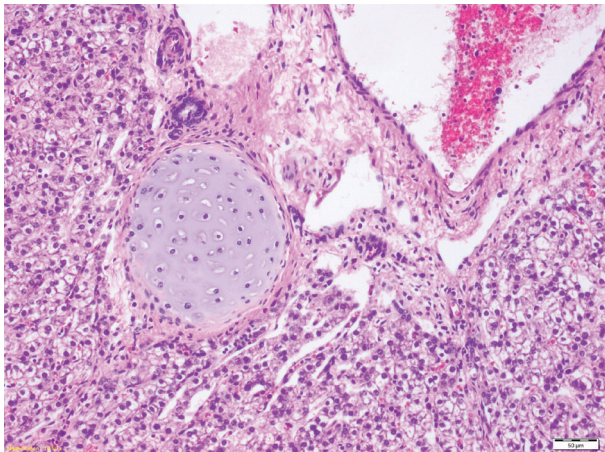


Figure 1. Photomicrograph of a cartilaginous choristoma in the liver (HE,  $\times 100$ )

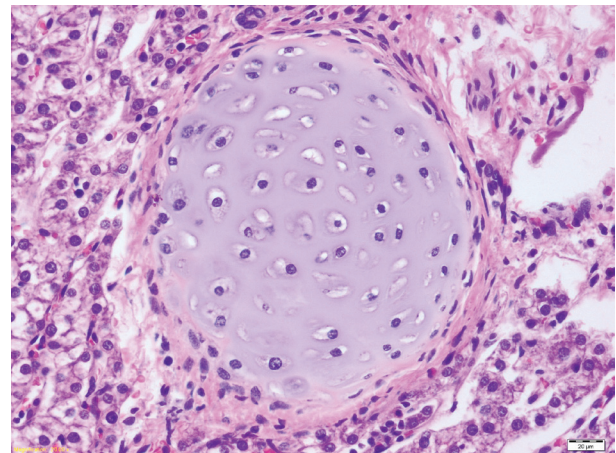


Figure 2. Photomicrograph of a cartilaginous choristoma in the liver (HE,  $\times 200$ )

## RESULTS

In one male piglet from the control group the autopsy showed normal appearance of all internal organs, without any pathology. This piglet was a crossbreed, two months old, weighed 1.46 kg on the fifth day and 7 kg at two months, and was fed with wheat and corn food without any supplements or drugs. The organs of this piglet were sampled and labelled. The examined sections from all sampled organs were within normal limits except for the liver. In one portal tract, a mature cartilage tissue was found: an oval, well demarcated tissue with dimensions of 0.2 by 0.2 mm (Figure 1). The cartilage cells were quite normal in position and cytological appearance (Figure 2). The tissue of that portal tract was normal (arterial and venous blood vessels and the biliary duct). The surrounding hepatocytes were regular. No other portal tracts in the tissue block were changed. The other organs sampled from that animal were normal.

## DISCUSSION AND CONCLUSIONS

Choristomas are small aggregates of normal tissue components in aberrant locations. These ectopic islands of normal tissue may also be mistaken for true neoplasms (Strayer and Rubin 2012). They are not tumours, although their gross or microscopic appearance may resemble that of tumours. Examples of choristomas include pancreatic rests in the walls of gastrointestinal organs, and adrenal tissue in the renal cortex (Strayer and Rubin

2012). Choristomas must be differentiated from other similar lesions like ectopias and hamartomas.

Ectopia is a congenital displacement or malposition of an organ, tissue or cells. Heterotopia is frequently used as a synonym for ectopia. Hamartomas are anomalies comprising malformations of organs due to abnormal mixture of tissue elements which are normally found at that site. They are focal overgrowths of one or more mature cellular elements of a normal tissue, often arranged irregularly. Many hamartomas show clonal origin and have defined DNA rearrangements, and thus may be classified as true neoplasms (Strayer and Rubin 2012).

In this case report, we presented a normal mature cartilage tissue in the portal tract of the liver. In our opinion it is a case of choristoma and we believe that there is no other reasonable explanation for this unusual finding.

Theories which may explain the origin of developmental anomalies include entrapment of tissue during embryological development, embolisation and subsequent development of seeded cells and metaplasia arising from totipotent cells. However, there is no proof for any of these theories.

A review of the literature data revealed no case reports of cartilaginous choristoma in animal organs, so to the best of our knowledge, this is the first case of a mature cartilaginous choristoma in a pig liver. This finding shows that epithelial and mesenchymal choristomas can occur in the liver and also, that solid nodules in the liver are not necessarily a benign or malignant tumour.

However, some questions remain: namely, what is the significance of this finding, do such choristo-

mas grow with the pig and become grossly visible, how often do they occur, and how often are they missed?

## REFERENCES

- Barron CN (1970): Ectopic Pancreas in the Rat – Report of a Case. *Pathologia Veterinaria* 7, 81–83.
- Briziarelli G, Tornabeni JA (1972): Ectopic pancreas in the liver of a rat. *Veterinary Pathology* 9, 263–265.
- Knostman KAB, Weisbrode SE, Marrie PA, Worman JL (2003): Intrahepatic splenosis in a dog. *Veterinary Pathology* 40, 708–710.
- Pavarini SP, Oliveira EC, Santos AS, Sonne L, Raymundo DL, Juffo GD, Bezerra Junior PS, Driemeler D (2010): Hemoperitoneum in a dog with hepatic splenosis. *Acta Scientiae Veterinariae* 38, 433–437.
- Quesada O, Suarez-Bonnet A, Andrada M, Fernandez A, Espinosa de los Monteros A (2010): Epithelial and Pancreatic Choristoma in Bovine Lymph Nodes. *Journal of Comparative Pathology* 142, 218–222.
- Strayer DS, Rubin E (2012): Neoplasia. In: Rubin R, Strayer DS (eds.): *Rubin's Pathology: Clinicopathologic Foundations of Medicine*. 6<sup>th</sup> ed. Wolter Kluwer and Lippincott, Williams & Wilkins, Philadelphia. 157–212.
- Tanimoto T, Ohtsuki Y (1993): Heterotopic splenic tissue in the liver of a swine. *Journal of Veterinary Medical Science* 55, 485–486.

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