

Pancreatic extramedullary hematopoiesis in a dog

Hematopoiese extramedular pancreática em um cão

Crisan Smaniotto^{1*} , Vinicius Dahm¹ , Amália Ferronato¹ , Lorena dos Santos Pinheiro¹ ,
Pietra Malu Franzener Detoni¹ , Aline de Marco Viott¹ 

ABSTRACT: Extramedullary hematopoiesis (EMH) is a condition in which hematopoietic cells proliferate outside the bone marrow. It is more commonly observed in the spleen, but its presence is also found less frequently in other sites such as lymph nodes and the liver. The aim of this report is to describe a case of EMH in an atypical location. Necropsy of a 10-year-old male Rottweiler dog revealed a nodular lesion in the pancreatic tissue that was microscopically compatible with EMH. This condition is rare in the pancreas, with no reports existing in veterinary medicine and only one found in human medicine, where it was suggested to be associated with squamous cell carcinoma of the lung. The authors of the present case suggest the inclusion of EMH as a differential diagnosis in cases of nodular pancreatic lesions and reaffirm the importance of histopathology for the correct diagnosis.

KEYWORDS: Hematopoietic tissue; histopathology; necropsy; pancreas.

RESUMO: A hematopoiese extramedular (HEM) é uma condição na qual as células hematopoiéticas proliferam fora da medula óssea. É comumente observada no baço, mas também ocorre em menor frequência em outros locais, como linfonodos e fígado. O objetivo deste relato é descrever um caso de HEM em localização atípica. A necropsia de um cão Rottweiler macho de 10 anos de idade revelou uma lesão nodular no tecido pancreático, sendo microscopicamente compatível com HEM. Esta condição é rara no pâncreas, não havendo relatos na medicina veterinária e apenas um encontrado na medicina humana, onde foi sugerida a sua associação com o carcinoma de células escamosas pulmonar. Os autores do presente caso sugerem a inclusão da HEM como diagnóstico diferencial nos casos de lesões nodulares pancreáticas e reafirmam a importância da histopatologia para o correto diagnóstico.

PALAVRAS-CHAVE: Tecido hematopoiético; histopatologia; necropsia; pâncreas.

INTRODUCTION

Extramedullary hematopoiesis (EMH) is characterized by the proliferation of blood components outside the bone marrow in response to some medullary dysfunction in the production of hematopoietic components. In general, any tissue can be considered a site of proliferation of hematopoietic cells, but the splenic tissue is the most common. The main causes involved are usually severe bone marrow failure, as a consequence of hemolytic anemia and myelofibrosis, excessive myelostimulation, damaging inflammatory processes, tissue repair, and abnormal production of chemokines. However, malignant solid tumors may also be related to the development of this condition, according to some reports (Bao *et al.*, 2018; Boes;

Durham, 2017; Johns; Christopher, 2012). The aim of this study is to report an unusual case of pancreatic EMH associated with a previous tumor process.

CASE REPORT

A 10-year-old male Rottweiler dog which had been in lateral recumbency for a month and presenting with intense neck pain, urinary incontinence, hematuria, hip dysplasia, and hindlimb paralysis, was referred for necropsy. Hematological tests showed normocytic normochromic anemia and increased Alanine Aminotransferase (ALT) and Alkaline Phosphatase (ALP).

Anatomopathological findings revealed a productive osteoblastic osteosarcoma in the cervical vertebra (C7) with

¹ Universidade Federal do Paraná, Palotina/PR, Brasil

*Corresponding author: crisan.smaniotto@ufpr.br

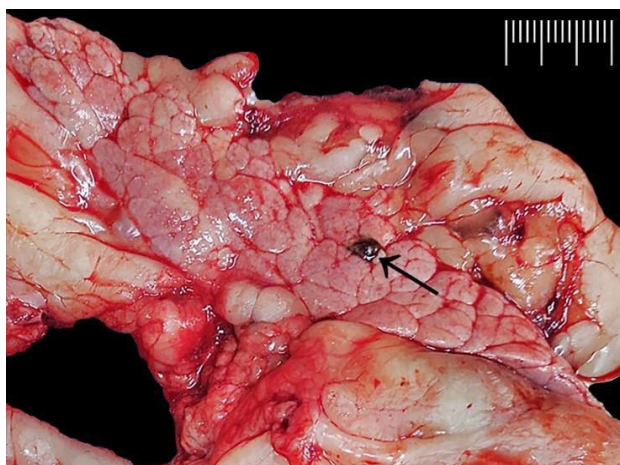
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a focus of metastasis to the left kidney, in addition to splenic nodular hyperplasia (6.0 × 5.0 × 4.5 cm) and bilateral adrenal pheochromocytoma (0.9 × 0.7 cm and 0.7 × 0.6 cm). Evaluation of the pancreatic tissue indicated the presence of a well-circumscribed, reddish, and soft nodular lesion measuring approximately 0.5 cm × 0.4 cm (Figure 1).

Histological examination of this tissue showed the presence of a light focal area surrounded by a thin layer of connective tissue (Figure 2), filled with myeloid, lymphoid, erythroid, and megakaryocyte precursors (Figure 3).

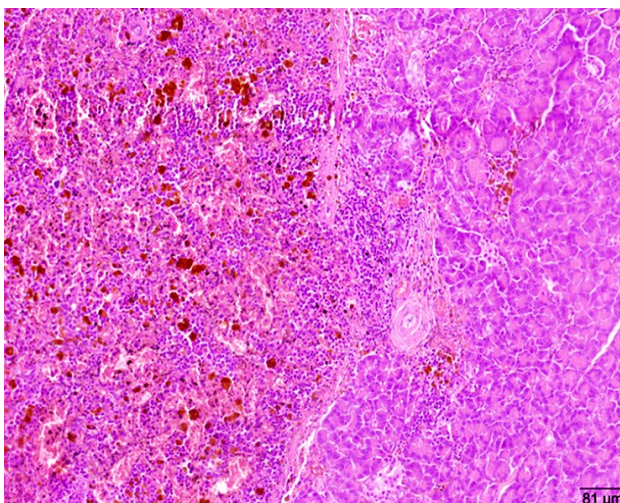
RESULTS AND DISCUSSIONS

Based on the foregoing, the histopathological findings of the pancreatic tissue were compatible with EMH. This is a



Fonte: Laboratório de Patologia Veterinária da Universidade Federal do Paraná (UFPR).

Figure 1. Pancreas; presence of well circumscribed, reddish nodular structure measuring 0.5 × 0.4 cm, interspersed with pancreatic tissue (black arrow).



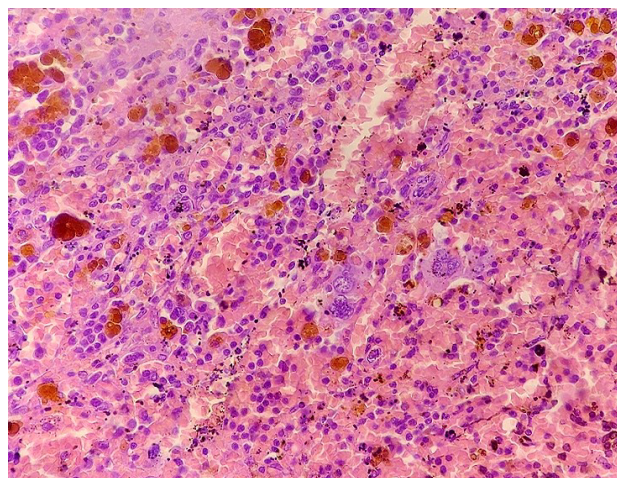
Fonte: Laboratório de Patologia Veterinária da Universidade Federal do Paraná (UFPR).

Figure 2. Histological section of the pancreas showing proliferation of hematopoietic precursors adjacent to the normal pancreatic parenchyma, Hematoxylin-Eosin, 36x.

frequent alteration in the splenic and hepatic tissues, but its occurrence in other tissues is not very common. There is a strong theory of the correlation between EMH and neoplastic processes, although there is no concrete explanation for this phenomenon. One of the possible explanations is thought to be an abnormal production of cytokines or paracrine growth factors that, in some situations, can be produced by tumor cells and consequently stimulate the differentiation of stem cells into hematopoietic cells (Johns; Christopher, 2012; O'malley, 2007).

In human medicine, there are several reports of EMH in unusual tissues, some of which are the liver, lymph nodes, peritoneum, pleura, and kidneys. Interestingly, there is one single report of pancreatic EMH, described in the year 1998 in an elderly man who was later diagnosed with squamous cell carcinoma of the lung (Bao *et al.*, 2018; Crider; Kroszer-Hamati; Koyamangalath, 1998). In Veterinary Medicine, reports of EMH in atypical sites are rare. This condition has already been reported in the adrenal gland of dogs (Tochetto *et al.*, 2018), but no focus of pancreatic EMH has been found thus far.

An important differential diagnosis to be considered in this case is myelolipoma, which macroscopically is spherical, soft, and friable, ranging from whitish to yellowish, with some areas possibly reddish to blackish. Microscopically, it is a benign proliferation of hematopoietic and adipose tissue, very similar to the findings in EMH (Valli; Bienzle; Meuten, 2017). Nonetheless, the absence of adipocytes and the macroscopic pattern support the diagnosis of EMH. Inflammatory and congestive conditions can also be considered differential diagnoses in these cases, however, the cellular characterization is enlightening, since in these conditions there is a predominance of mature inflammatory cells and vascular changes, respectively.



Fonte: Laboratório de Patologia Veterinária da Universidade Federal do Paraná (UFPR).

Figure 3. Histological section of the pancreatic nodular lesion, marked by the proliferation of lymphoid, erythroid, myeloid, megakaryocytic precursors and macrophages containing hemosiderin, Hematoxylin-Eosin, 26x.

CONCLUSION

Although the origin of the EMH reported here is not known exactly, the macroscopic presentation of the pancreas makes

this case extremely unusual and rare in veterinary medicine, and should be included as a differential diagnosis of alterations in this organ.

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