ATATÜRK ÜNİVERSİTESİ YAYINLARI
ATATURK UNIVERSITY PUBLICATIONS

Case Report *Olgu Sunumu* DOI: 10.5281/zenodo.12577687

Histopathologic and Immunohistochemical Approach to a Case of Invasive Cribriform Carcinoma in Mammary Tissue of Sprague Dawley Rat

Sprague Dawley Ratının Meme Dokusunda İnvaziv Kribriform Karsinom Olgusuna Histopatolojik ve İmmünohistokimyasal Yaklaşım

Metin KİLİÇLİOĞLU[1]
Berrah GÖZEGİR[1]
İsmail BOLAT[1*]
Yavuz Selim SAĞLAM[1]
Serkan YILDIRIM[1]

[1]Department of Pathology, Atatürk University, Faculty of Veterinary Medicine, Erzurum, TÜRKİYE

ABSTRACT

Breast cancer is a neoplastic disease that originates in the breast tissue and can metastasize to other tissues and organs, especially the lung and liver. It is one of the most common cancers in dogs and cats, especially in humans. Breast cancers exhibit striking genetic and phenotypic diversity and have a highly complex mechanism. There are many subtypes of mammary cancer with different biological and pathologic features and different clinical course. In this case report, the mass detected in the abdominal region of the rat was removed under general anesthesia. The mass was examined macroscopically, histopathologically and immunohistochemically. As a result of the examinations, invasive cribriform carcinoma was diagnosed in mammary tissue. In immunohistochemical analysis, Ki67 and α-SMA expressions were detected in the mass. In this case report, we contributed to the literature by determining the histopathologic findings of Invasive Cribriform Carcinoma in mammary tissue of rats and the expression levels of Ki67 and α-SMA in these carcinomas.

Keywords: Cancer, Histopathology, Immunohistochemistry, Mammary, Rat

ÖZ

Meme kanseri, meme dokusundan kaynaklanan ve başta akciğer ve karaciğer olmak üzere diğer doku ve organlara metastaz yapabilen neoplastik bir hastalıktır. Köpek ve kedilerde, özellikle de insanlarda en sık görülen kanserlerden biridir. Meme kanserleri çarpıcı genetik ve fenotipik çeşitlilik gösterir ve oldukça karmaşık bir mekanizmaya sahiptir. Meme kanserinin farklı biyolojik ve patolojik özellikleri ve farklı klinik seyri olan pek çok alt tipi bulunmaktadır. Bu olgu sunumunda sıçanın karın bölgesinde tespit edilen kitle genel anestezi altında çıkarıldı. Kitle makroskobik, histopatolojik ve immünohistokimyasal olarak incelendi. Yapılan incelemeler sonucunda meme dokusunda invazif kribriform karsinom tanısı konuldu. İmmunhistokimyasal analizde kitlede Ki67 ve α-SMA ekspresyonları tespit edildi. Bu olgu sunumunda, sıçanların meme dokusunda İnvazif Kribriform Karsinom'un histopatolojik bulgularını ve bu karsinomlarda Ki67 ve α-SMA ekspresyon düzeylerini belirleyerek literatüre katkı sağladık.

Anahtar Kelimeler: Kanser, Histopatoloji, İmmunohistokimya, Meme, Rat

Geliş Tarihi/Received 22.05.2024
Revizyon/Revision 11.06.2024
Kabul Tarihi/Accepted 26.06.2024
Yayın Tarihi/Publication Date 30.06.2024

Sorumlu Yazar/Corresponding author:
İsmail BOLAT
E-mail: İsmail.bolat@atauni.edu.tr
Cite this article: Kiliçlioğlu M, Gözegir B, Bolat İ, Sağlam YS, Yıldırım S. A Case Reports: Histopathologic and Immunohistochemical Approach to a Case of Invasive Cribriform Carcinoma in Mammary Tissue of Sprague Dawley Rat. *J Vet Case Rep*. 2024;4(1):11-13.

INTRODUCTION

In all living organisms, the processes of renewal of cells and tissues, functioning of organs and systems, growth, development, stopping growth when necessary and apoptosis (programmed cell death) continue within the framework of an order called homeostasis. Disruption occurring at any stage of homeostasis adversely affects physiologic stages and hyperplasia or neoplasms occur in cells, especially as a result of problems in the apoptosis process.[1] The breast is an organ with a very large area and a high risk for cancer.[2] Breast tumors are tumors that start directly in the mammary gland or can spread from the primary tumor focus to the entire breast tissue by metastasis. At the same time, tumors originating from the breast tissue may metastasize to regional and distant lymph nodes and other organs, especially the lung and liver.[3] Tumors in the mammary glands occur at an advanced age and are perceived as subcutaneous masses. Mammary tumors are one of the most common tumors in many rat species. The incidence and nature of mammary tumors in aged female rats varies in different species.[3-5] In laboratory rats, the mammary gland is an important organ, especially in terms of evaluation for potential carcinogenic effects. Tumors in the mammary gland occur at an advanced age and are perceived as subcutaneous masses. Mammary tumors are one of the most common tumors in many rat and rat species. The incidence and nature of mammary tumors in aged female rats may vary in different breeds. Invasive cribriform carcinoma (ICC) is a special type of mammary cancer that has different biological and pathological characteristics of breast cancer and may have a different clinical course. ICC is a rare type of primary breast carcinoma with an incidence of 0.3-3.5%.[6-8]

In this case report, we aimed to reveal the histopathologic findings of Invasive Cribriform Carcinomas (ICC) detected in rat mammary tissue and the expression levels of Ki67 and alpha-smooth muscle actin (α-SMA) in these carcinomas.

CASE PRESENTATION

This case was observed in an 8-month-old sprague dawley rat. Clinical examination revealed difficulty in walking, depression and loss of appetite. A mass formation in the inguinal region and hypersensitivity in this region were also detected. The mass in the abdominal region was removed under general anesthesia. Macroscopic examination of the mass revealed that the mass had a lobular structure and its surface had a mottled appearance (Figure 1). The weight of the mass was 19 g and its dimensions were calculated to be 4*4*2 cm. The mass was fixed in 10% neutral buffered formaldehyde solution and routine histopathologic examination procedure was performed.

Figure 1. *Macroscopic appearance of the mass taken from breast tissue.*

Histopathologic examinations revealed a cribriform pattern of invasive carcinoma and the presence of irregular islets throughout the mass. Exudate accumulations were observed in the center of the masses. The anaplastic cells in the mass were well differentiated, smaller, more homogeneous and had a round or oval nucleus with mild to moderate nuclear atypia. Very rare mitotic figures were observed (Figure 2).

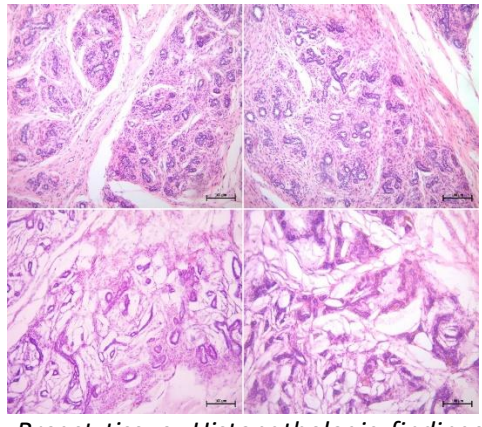

Figure 2. *Breast tissue, Histopathologic findings seen in Invasive Cribriform Carcinoma, H&E, Bars: 100µm.*

Immunohistochemical examinations revealed severe Ki67 and α-SMA expressions in anaplastic cells (Figure 3).

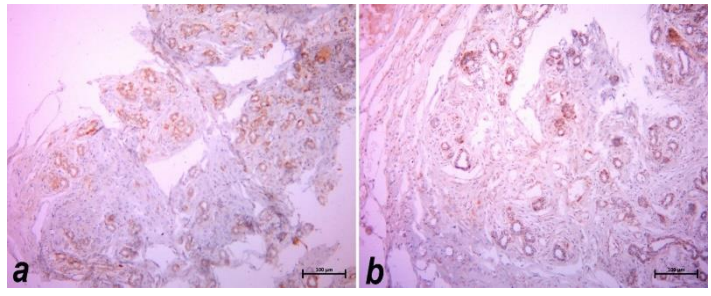

Figure 3. *Breast tissue, Ki67 expressions (a) and α-SMA expressions (b), IHC-P, DAB, Bars: 100µm.*

DISCUSSION

Different types of cancer are seen in rats, as in many domestic animal species and humans. The most prominent of these cancers is breast cancer. In rats used in many experimental breast cancer models, breast cancer can develop naturally with advancing age.[1]

In case reports, it was reported that histopathological examination of breast tumors revealed milk duct epithelial cells, glandular and lobular structures consisting of papillary, tubular, cribriform and comedo patterns, papillary pattern, multiple branched papillae covered by cuboidal to columnar epithelium, increased neoplastic cells (mitotic figure), thickened tissues with a few glandular structures spread in stromal tissues and vascularization was very common.[9] In invasive cribriform carcinomas, it was reported that anaplastic cells were small in size, atypia could not be determined exactly and mitosis was rare. Histopathologic examinations revealed a cribriform pattern of invasive carcinoma and the presence of irregular islets throughout the mass. Exudate accumulations were observed in the center of the masses. The anaplastic cells in the mass were well differentiated, smaller, more homogeneous and had a round or oval nucleus with mild to moderate nuclear atypia. Very rare mitotic figures were observed.

Immunohistochemistry is an important method of diagnostic breast pathology. It is widely used for diagnostic purposes in most solid tumors, including breast cancer. Ki67 and alpha-smooth muscle actin (α-SMA) proteins are known to be very important in the diagnosis of breast tumors. In different studies, it has been reported that Ki67 and alpha-smooth muscle actin (α-SMA) expression levels are significantly increased in breast tumors.[10,11] In this case report, high levels of Ki67 and α-SMA expressions were found in Invasive Cribriform Carcinoma developing in breast tissue, just like in breast tumors.

Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: *[Metin KİLİÇLİOĞLU (MK), Berrah GÖZEGİR (BG), İsmail BOLAT (İB), Yavuz Selim SAĞLAM (YSS), Serkan YILDIRIM (SY]: Fikir-SY; Tasarım-SY; Denetleme-SY,YSS; Kaynaklar-İB,BG; Veri Toplanması ve/veya İşlemesi-MK,BG; Analiz ve/ veya Yorum-SY,YSS; Literatür Taraması-BG,MK; Yazıyı Yazan-İB,SY,BG; Eleştirel İnceleme-YSS*
Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmiştir.
Finansal Destek: Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

Peer-review: Externally peer-reviewed.
Author Contributions: *[Metin KİLİÇLİOĞLU (MK), Berrah GÖZEGİR (BG), İsmail BOLAT (İB), Yavuz Selim SAĞLAM (YSS), Serkan YILDIRIM (SY]: Concept-SY; Design-SU; Supervision-SY,YSS; Resources-İB,BG; Data Collection and/or Processing-MK,BG; Analysis and/or Interpretation-SY,YSS; Literature Search-BG,MK; Writing Manuscript-İB,SY; Critical Review-YSS*

Conflict of Interest: The authors have no conflicts of interest to declare.
Financial Disclosure: The authors declared that this study has received no financial support.

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