

## MALİGN EPİTELYAL TÜMÖRLER -I

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### GİRİŞ

İnvaziv Meme Karsinomu (İMK); memenin glandüler elemanlarının oluşturduğu geniş ve heterojen bir grup malign epitelyal neoplazmi temsil eder (1). Bu tümörlerin morfolojik olarak tanımlanmış birçok alt tipi mevcuttur ve kitabın bu ve bir sonraki bölümünde detaylı olarak tartışılacaktır. Ancak önemli olan bir başka nokta; morfolojik tiplendirme yanı sıra tümörde izlenen immün belirteçlerin esas alındığı ikinci bir tiplendirmenin varlığıdır. Bu tiplendirme tedavide önem arz eder ve tümörün östrojen reseptörü (ER) ve Erb-B2 reseptör tirozin kinaz 2 (ERBB2, HER2) durumuna göre yapılmaktadır. Bu alt tiplendirmeye göre memenin epitelyal tümörleri dört ana başlıkta sınıflanabilir (1).

1. ER pozitif, HER2 negatif
2. ER pozitif, HER2 pozitif
3. ER negatif, HER2 pozitif
4. ER negatif, HER2 negatif

### Lokalizasyon

Meme kanserlerinin büyük bir çoğunluğu (%90) üst dış kadranda daha sık görülmekle be-

raber memenin herhangi bir kadranında genellikle tek odakta görülür (2). Hastaların %2'sinde senkron, kontralateral tümör bulunmaktadır (3).

### Klinik özellikler

Düzenli tarama yöntemleri kullanılmayan popülasyonlarda İMK'nın en sık belirtisi palpabl kitledir. Bunun yanı sıra deri çekintisi, meme başı inversiyonu, meme boyutu ya da şeklinde değişiklik, nadir vakalarda ise deri ülserasyonu görülebilir. Tarama yöntemleri uygulanan popülasyonlarda ise meme kanserinin en önemli belirtisi kalsifikasyonun da eşlik edebileceği spiküle kitledir (1).

### Epidemiyoloji

Meme kanseri, kadınlarda görülen kanserlerin %24'ünü oluşturur ve kadınlarda en sık görülen kanser tipidir. Dünya genelinde kadınlarda görülen kansere bağlı ölümlerin de en sık nedeni (4). Son yıllarda düşük gelirli ve orta gelirli ülkelerde İMK insidansı artış göstermekteyken 2000'li yılların başında yüksek gelir seviyeli, Amerika Birleşik Devletleri, Kanada, İngiltere, Fransa ve Avusturalya gibi ülkelerde insidansın düştüğü

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## Prognoz

Müsinöz karsinomun 5 yıllık hastalısız yaşam oranı çok yüksektir ve çok düşük oranda lokal veya uzak rekkürens görülür. Ancak >%50 oranında mikropapiller patern içeren MK'un prognozunun daha kötü olabileceği akılda tutulmalıdır (87).

## MÜSİNÖZ KİSTADENOKARSİNOM

Müsinöz kistadenokarsinom; intrasitoplazmik müsin içeren yüksek kolumnar hücrelerin döşediği kistik yapılar içeren invaziv meme karsinomudur. Pankreatobilier veya ovaryan müsinöz kistadenokarsinoma benzerlik gösterir. Ortalama 3 cm tümör çapı içeren (0,8-19 cm) kitle şeklinde prezente olurlar. Literatürde çok nadir görülen bir tümör olarak tariflenmiştir. Yaklaşık 30 adet olgu bildirilmiş olup bunların büyük çoğunluğu Asyalı kadınlarda tariflenmiştir (88,89).

## Histopatoloji

Müsinöz kistadenokarsinom; stratifikasyon, tomurcuklanma ve papiller yapılar oluşturan yüksek kolumnar hücreler ile döşeli kistik boşluklar ile karakterize bir tümördür. Neoplastik hücrelerin nükleusları bazalde dizilim gösterir ve hücreler intrasitoplazmik müsin içerirler. Sitolojik atipi değişkenlik gösterir (88). Müsinöz karsinom ve enkapsüle papiller karsinomdan ayırımı yapılmalıdır. Olguların çoğu ER, PR ve ERBB2(HER2) negatiftir (88,90). HER2 pozitif az sayıda olgu da bildirilmiştir (91,92,93). CK7 pozitif ve CK20 negatif olmaları metastatik pankreatobilier müsinöz kistadenokarsinomdan ayırımını kolaylaştırır.

## Prognoz

Genellikle iyi prognoza sahiptirler, literatürde bildirilen olgulardan 4'ünde lenf nodu metastazı da mevcuttur ve bu oran ile lenf nodu metastazı sık olarak kabul edilmemektedir. Takip süresi kısıtlı olmakla birlikte henüz uzak metastaz tanımlanmamıştır. Yaygın yüksek dereceli DKIS' in eşlik ettiği tek bir olguda lumpektomiden 8 yıl sonra lokal rekürens bildirilmiştir (90).

## SONUÇ

Kadınlarda görülen tüm kanserlerin %24 'ünü temsil eden İMK'un tanımlanması, prognostik faktörlerin belirlenmesi, hastalığın yönetimi için çok kıymetlidir. Tanı, sitoloji, kor biyopsi veya eksizyonel biyopsi materyalinin patolojik değerlendirmesi sonucunda konulur. Ancak doğru tanı için tümör tiplerine ait histomorfolojik ve immünohistokimyasal verileri birlikte değerlendirmek gereklidir. Buna rağmen bazı olgularda ayırıcı tanı yine güçlük oluşturabilir. Dolayısı ile patolojik değerlendirme tanı için esas olsa da hastalığın yönetimi için yeterli olmayacaktır. Hastalığın doğru yönetilebilmesi için multidisipliner yaklaşım esastır. Memenin epitelyal tümörlerinin patolojik tanısı için WHO klasifikasyonu esas alınır. Bu kitapta memenin epitelyal tümörleri birbirini takip eden iki bölüm halinde, tanıda dikkat edilmesi gereken önemli noktalara değinilerek tartışılmıştır. Tümörün histopatolojik özellikleri yanı sıra, makroskopik, klinik ve radyolojik bulguların birlikte değerlendirilmesi ayırıcı tanıların dışlanarak, doğru tanıya ulaşılmasını kolaylaştıracaktır.

## KAYNAKLAR

1. Rakha EA, Allison KH, Ellis IO et al. Invasive breast carcinoma: general overview. In:WHO Classification of Tumours Editorial Board. Breast tumours. WHO classification of tumours series. 5th ed, Lyon (France): International Agency for Research on Cancer, 2019;82-101.
2. Bright CJ, Rea DW, Francis A, et al. Comparison of - quadrant-specific breast cancer incidence trends in the United States and England between 1975 and 2013. Cancer Epidemiol. 2016;44:186-94.
3. Walker GV, Smith GL, Perkins GH, et al. Population-based analysis of occult primary breast cancer with axillary lymph node metastasis. Cancer. 2010;116(17):40006.
4. Bray F, Ferlay J, Soerjomataram I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin, 2018;68(6):394-424.
5. Brenn T, Fletcher CD. Radiation-associated - cutaneous - atypical - vascular lesions and angiosarcoma: clinicopathologic analysis of 42 cases. Am J Surg Pathol. 2005;29(8):983-96.

6. Rossouw JE, Anderson GL, Prentice RL, et al. Risks and benefits of estrogen plus progestin in healthy postmenopausal women: principal results from the Women's Health Initiative randomized controlled trial. *JAMA*. 2002;288(3):321-33.
7. Tuncel F, Gokalp Satıcı FE, Bozkurt F et al. Clinicopathological features of breast cancer cases and their relationship with immunohistochemical findings. *Ann Med Res* 2020; 27(6):1715-21.
8. Paksoy SE, Tasdelen I, Balaban AS, et al. A comparison of Ki67 proliferative index in primary tumor and axillary metastatic lymph nodes with length of survival in patients with breast cancer. *Bratislava Lek Listy* 2013; 114:645-9.
9. Newcomb PA, Trentham-Dietz A, Hampton JM, et al. Late age at first full term birth is strongly associated with lobular breast cancer. *Cancer*. 2011 May 1;117(9):1946-56.
10. Hicks DA, Lester SC. Risk factors of developing breast carcinoma. In: Hicks DA, Lester SC (eds) *Diagnostic Pathology: Breast*. 2nd ed, Philadelphia: Elsevier:2016:184-9.
11. IARC Working Group on the Evaluation of - Carcinogenic - Risks to - Humans. *Pharmaceuticals*. Volume 100 A. A review of human carcinogens. *IARC Monogr Eval Carcinog Risks Hum*. 2012;100:1-401.
12. Smith-Warner SA, Spiegelman D, Yaun SS, et al. Alcohol and breast cancer in women: a pooled analysis of cohort studies. *JAMA*. 1998;279(7):535-40.
13. Suzuki R, Orsini N, Mignone L, et al. Alcohol intake and risk of breast cancer defined by estrogen and progesterone receptor status-a meta-analysis of epidemiological studies. *Int J Cancer*. 2008; 122(8):1832-41.
14. Luo J, Margolis KL, Wactawski-Wende J, et al. Association of active and passive smoking with risk of breast cancer among postmenopausal women: a prospective cohort study. *BMJ*. 2011;342:d1016.
15. Gaudet MM, Gapstur SM, Sun J, et al. Active smoking and breast cancer risk: original cohort data and meta-analysis. *J Natl Cancer Inst*. 2013;105(8):515-25.
16. Lopez-Garcia MA, Geyer FC, Lacroix-Triki M, et al. Breast cancer precursors revisited: molecular features and progression pathways. *Histopathology*. 2010; 57(2):171-92.
17. Hammond ME, Hayes DF, Dowsett M, et al. American Society of Clinical Oncology! College of American Pathologists guideline recommendations for immunohistochemical testing of estrogen and progesterone receptors in breast cancer. *Arch Pathol Lab Med*. 2010 Jun; 134(6):907-22.
18. Denkert C, von Minckwitz G, Darb-Esfahani S, et al. Tumor-infiltrating lymphocytes and prognosis in different subtypes of breast cancer: a pooled analysis of 3771 patients treated with neoadjuvant therapy. *Lancet Oncol*. 2018;19(1):40-50.
19. Loi S, Michiels S, Salgado R, et al. Tumor infiltrating lymphocytes are prognostic in triple negative breast cancer and predictive for trastuzumab benefit in early breast cancer: results from the FinHER trial. *Ann Oncol*. 2014;25(8):1544-50.
20. Tuncel F, Bozkurt F, Berkesoglu M. The value of maspin and PD-L1 expression and peritumoral lymphocytic infiltration in breast tumors. *Bratislava Med J*. 2020;121(12): 894-900.
21. Zhang M, Sun H, Zhao S et al. Expression of PD-L1 and prognosis in breast cancer: a meta-analysis. *Oncotarget* 2017; 8: 31347-31354.
22. Goldhirsch A, Winer EP, Coates AS, et al. Personalizing the treatment of women with early breast cancer: highlights of the St Gallen International Expert Consensus on the Primary Therapy of Early Breast Cancer 2013. *Ann Oncol*. 2013; 24(9):2206-23.
23. Cserni G. Histological type and typing of breast carcinomas and the WHO classification changes over time. *Pathologica* 2020;112: 25-41.
24. Schnitt SJ. Epithelial tumours of the breast. In: WHO Classification of Tumours Editorial Board. *Breast tumours. WHO classification of tumours series*. 5th ed, Lyon (France): International Agency for Research on Cancer, 2019:9-12.
25. Rakha EA, Allison KH, Bu H et al. Invasive breast carcinoma of no special type. In: WHO Classification of Tumours Editorial Board. *Breast tumours. WHO classification of tumours series*. 5th ed, Lyon (France): International Agency for Research on Cancer, 2019:102-109.
26. Sung HJ, Maeng YI, Kim MK, et al. Breast carcinoma with choriocarcinomatous features: a case report. *J Breast Cancer*. 2013;16(3):349-53.
27. Mohammadi A, Rosa M. Carcinoma of the breast with choriocarcinomatous features. *Arch Pathol Lab Med*. 2011;135(9):1097-100.
28. Akbulut M, Zekioglu O, Ozdemir N, et al. Fine needle aspiration cytology of mammary carcinoma with choriocarcinomatous features: a report of 2 cases. *Acta Cytol*. 2008;52(1):99-104.
29. Nobukawa B, Fujii H, Hirai S, et al. Breast carcinoma diverging to aberrant melanocytic differentiation: a case report with histopathologic and loss of heterozygosity analyses. *Am J Surg Pathol*. 1999;23(10):1280-7.
30. Padmore RF, Lara JF, Ackerman DJ, et al. Primary combined malignant melanoma and ductal carcinoma of the breast. A report of two cases. *Cancer*. 1996;78(12):2515-25.
31. Ruffolo EF, Koerner FC, Maluf HM. Metaplastic carcinoma of the breast with melanocytic differentiation. *Mod Pathol*. 1997 10(6);592

32. Bachmeier BE, Nerflich AG, Mirisola V, et al. Lineage infidelity and expression of melanocytic markers in human breast cancer. *Int J Oncol.* 2008;33(5):1011-5.
33. Itagaki H, Yamamoto T, Hiroi A, et al. Synchronous and bilateral oncocytic carcinoma of the breast: a case report and review of the literature. *Oncol Lett.* 2017;13(3):1714-8.
34. Kurebayashi J, Izuo M, Ishida T, et al. Two cases of lipid-secreting carcinoma of the breast: case reports with an electron microscopic study. *Jpn J Clin Oncol.* 1988; 18(3):249-54.
35. Lim-Co RY, Gisser SD. Unusual variant of lipid-rich mammary carcinoma. *Arch Pathol Lab Med.* 1978; 193-5.
36. Mazzella FM, Sigber SC, Braza F. Ductal carcinoma of male breast with prominent lipid-rich component. - *Pathology.* 1995;27(3):280-3.
37. Hisaoka M, Takamatsu Y, Hirano Y, et al. Sebaceous carcinoma of the breast: case report and review of the literature. *Virchows Arch.* 2006;449(4):484-8.
38. Murakami A, Kawachi K, Sasaki T, et al. Sebaceous carcinoma of the breast. *Pathol Int.* 2009 ;59(3):188-92.
39. Prescott RJ, Eyden BP, Reeve NL. Sebaceous differentiation in a breast carcinoma with ductal, myoepithelial and squamous elements. *Histopathology.* 1992;21(2):181-4.
40. Orzalesi L, Casella D, Criscenti V, et al. Microinvasive breast cancer: pathological parameters, cancer subtypes distribution, and correlation with axillary lymph nodes invasion, Results of a large single-institution series. *Breast Cancer.* 2016;23(4):640-8.
41. Li Y, Zhang S, Wei X, et al. The clinical features and management of women with ductal carcinoma in situ with microinvasion: a retrospective cohort study. *Int J Surg.* 2015;19:91-4.
42. Wang W, Zhu W, Du F, et al. The demographic - features, - clinicopathological characteristics and cancer-specific outcomes for patients with microinvasive breast cancer: a SEER database analysis. *Sci Rep.* 2017;7:42045.
43. Sopik V, Sun P, Narod SA. Impact of microinvasion on breast cancer mortality in women with ductal carcinoma in situ. *Breast Cancer Res Treat.* 2018;167(3):787-95.
44. Cserni G, Pinder SE, Koo JS et al. Allison KH, Bu H et al. Microinvasive carcinoma. In:WHO Classification of Tumours Editorial Board. Breast tumours. WHO classification of tumours series. 5th ed, Lyon (France): International Agency for Research on Cancer, 2019:110-13.
45. Gojon H, Fawunmi D, Valachis A. Sentinel lymph node biopsy in patients with microinvasive breast cancer: a systematic review and meta-analysis. *Eur J Surg Oncol.* 2014 Jan;40(1):5-11.
46. DiCostanzo D, Rosen PP, Gareen I, et al. Prognosis in infiltrating lobular carcinoma. An analysis of "classical" and variant tumors. *Am J Surg Pathol.* 1990 12-23.
47. Lesser ML, Rosen PP, Kinne DW. Multicentricity and bilaterality in invasive breast carcinoma. *Surgery.* 1982;91(2):234-40.
48. Hilleren DJ, Andersson IT, Lindholm K, et al. Invasive lobular carcinoma: mammographic findings in a 10-year experience. *Radiology.* 1991;178(1):149-54.
49. Krecke KN, Gisvold JJ. Invasive lobular carcinoma of the breast: mammographic findings and extent of disease at diagnosis in 184 patients. *AJR Am J Roentgenol.* 1993; 161(5):957-60.
50. Butler RS, Venta LA, Wiley EL, et al. Sonographic evaluation of infiltrating lobular carcinoma. *AJR Am J Roentgenol.* 1999;172(2):325-30.
51. Cawson JN, Law EM, Kavanagh AM. Invasive lobular carcinoma: - sonographic features of cancers detected in a BreastScreen program. *Australas Radiol.* 2001;45(1):2530.
52. Shin SJ, Desmedt C, Kristiansen G et al. Invasive lobular carcinoma. In:WHO Classification of Tumours Editorial Board. Breast tumours. WHO classification of tumours series. 5th ed, Lyon (France): International Agency for Research on Cancer, 2019:114-18.
53. Quincey C, Raitt N, Bell J, et al. Intracytoplasmic lumina-a useful diagnostic feature of adenocarcinomas. *Histopathology.* 1991;19(1):83-7.
54. Nakagawa S, Miki Y, Miyashita M, et al. Tumor microenvironment in invasive lobular carcinoma: possible therapeutic targets. *Breast Cancer Res Treat.* 2016;155(1):65-75.
55. Shousha S, Backhaus CM, AlagbandZadeh J, et al. Alveolar variant of invasive lobular carcinoma of the breast. A tumor rich in estrogen receptors. *Am J Clin Pathol.* 1986;85(1): 1-5.
56. Eusebi V, Magalhaes F, Azzopardi JG. Pleomorphic lobular carcinoma of the breast; an aggressive tumor showing apocrine differentiation. *Hum Pathol.* 1992;23(6):655-62.
57. Radhi JM. Immunohistochemical analysis of pleomorphic lobular carcinoma: higher expression of p53 and chromogranin and lower expression of ER and PgR. *Histopathology.* 2000 ;36(2):156-60.
58. Middleton LP, Palacios DM, Bryant BR, et al. Pleomorphic lobular carcinoma: morphology, immunohistochemistry, and molecular analysis. *Am J Surg Pathol.* 2000;24(12):1650-6.
59. De Leeuw WJ, Berx G, Vos CB, et al. Simultaneous loss of E-cadherin and catenins in invasive lobular breast cancer and lobular carcinoma in situ. *J Pathol.* 1997; 183 (4):400-11.

60. Acs G, Lawton TJ, Rebbeck TR, et al. Differential expression of E-cadherin in lobular and ductal neoplasms of the breast and its biologic and diagnostic implications. *Am J Clin Pathol.* 2001;115(1):85-98.
61. Da Silva L, Parry S, Reid L, et al. Aberrant expression of E-cadherin in lobular carcinomas of the breast. *Am J Surg Pathol.* 2008;32(5):773-83.
62. Christgen M, Steinemann D, Kuhnle E, et al. Lobular breast cancer: clinical, molecular and morphological characteristics. *Pathol Res Pract.* 2016;212(7):583-97.
63. Dixon JM, Anderson TJ, Page DL, et al. Infiltrating lobular carcinoma of the breast. *Histopathology.* 1982;6(2):149-61.
64. du Toit RS, Locker AP, Ellis IO, et al. Invasive lobular carcinomas of the breast-the prognosis of histopathological subtypes. *Br J Cancer.* 1989;60(4):605-9.
65. Arpino G, Bardou VJ, Clark GM, et al. Infiltrating lobular carcinoma of the breast: tumor characteristics and clinical outcome. *Breast Cancer Res.* 2004;6(3):R149-56.
66. Korhonen T, Huhtala H, Holli K. A comparison of the biological and clinical features of invasive lobular and ductal carcinomas of the breast. *Breast Cancer Res Treat.* 2004;85(1):23-9.
67. Kwast AB, Groothuis-Oudshoorn KC, Grandjean II, et al. Histological type is not an independent prognostic factor for the risk pattern of breast cancer recurrences. *Breast Cancer Res Treat.* 2012;135(1):271-80.
68. Rakha EA, Lee AH, Evans AJ, et al. Tubular carcinoma of the breast: further evidence to support its excellent prognosis. *J Clin Oncol.* 2010;28(1):99-104.
69. Oakley GJ 3rd, Tubbs RR, Crowe J, et al. HER-2 amplification in tubular carcinoma of the breast. *Am J Clin Pathol.* 2006; 126(1):55-8.
70. Anderson WF, Chu KC, Chang S, et al. Comparison of age-specific incidence rate patterns for different histopathologic types of breast carcinoma. *Cancer Epidemiol Biomarkers Prev.* 2004 1128-35.
71. van Deurzen CHM, Denkert C, Purdie CA. Tubular carcinoma. In: WHO Classification of Tumours Editorial Board. *Breast tumours. WHO classification of tumours series.* 5th ed, Lyon (France): International Agency for Research on Cancer, 2019:119-120.
72. Abdel-Fatah TM, Powe DG, Hodi Z, et al. High frequency of coexistence of columnar cell lesions, lobular neoplasia, and low grade ductal carcinoma in situ with invasive tubular carcinoma and invasive lobular carcinoma. *Am J Surg Pathol.* 2007;31(3):417-26.
73. Wolff AC, Hammond MEK, Allison KH, et al. Human epidermal growth factor receptor 2 testing in breast cancer; American Society of Clinical Oncology/College of American Pathologists - clinical - practice - guideline focused update. *Arch Pathol Lab Med.* 2018; 142(11):1364-82.
74. Diab SG, Clark GM, Osborne CK, et al. Tumor characteristics and clinical outcome of tubular and mucinous breast carcinomas. *J Clin Oncol.* 1999;17(5):1442-8.
75. Page DL, Dixon JM, Anderson TJ, et al. Invasive cribriform carcinoma of the breast *Histopathology.* 1983;7(4):525-36.
76. Marzullo F, Zito FA, Marzullo A, et al. Infiltrating cribriform carcinoma of the breast. A clinico-pathologic and immunohistochemical study of 5 cases. *Eur J Gynaecol Oncol.* 1996;17(3):228-31.
77. Ng WK. Fine needle aspiration cytology of invasive cribriform carcinoma of the breast with osteoclastlike giant cells: a case report. *Acta - Cytol.* - 2001;45(4):593-8.
78. Liu XY, Jiang YZ, Lin YR, et al. Clinicopathological characteristics and survival outcomes of invasive cribriform carcinoma of breast: a SEER population-based study. *Medicine (Baltimore).* 2015 Aug;94(31):e1309.
79. Liv H, Tan H, Cheng Y, et al. Imaging findings in mucinous breast carcinoma and correlating factors. *Eur J Radiol.* 2011;80(3):706-12.
80. Di Saverio S, Gutierrez J, Avisar E. A retrospective review with long term follow up of 11,400 cases of pure mucinous breast carcinoma. *Breast Cancer Res Treat.* 2008;111(3):541-7.
81. Wen HY, Desmedt C, Reis-Filho JS. Mucinous carcinoma. In: WHO Classification of Tumours Editorial Board. *Breast tumours. WHO classification of tumours series.* 5th ed, Lyon (France): International Agency for Research on Cancer, 2019:123-125.
82. Liu F, Yang M, Li Z, et al. Invasive micropapillary mucinous carcinoma of the breast is associated with poor prognosis. *Breast Cancer Res Treat.* 2015;151(2):443-51.
83. Collins LC, Cole KS, Marotti JD, et al. Androgen receptor expression in breast cancer in relation to molecular phenotype: results from the Nurses' Health Study. *Mod Pathol.* 2011 ;24(7):924-31.
84. Barbashina V, Corben AD, Akram M, et al. Mucinous micropapillary carcinoma of the breast an aggressive counterpart to conventional pure mucinous tumors. *Hum - Pathol.* 2013 ;44(8):1577-85.
85. Domfeh AB, Carley AL, Strigbe! JM, et al. WT immunoreactivity in breast carcinoma: selective expression in pure and mixed mucinous subtypes. *Mod Pathol.* 2008;21(10):1217-23.

86. Wendroth SM, Mentrikoski MJ, Wick MR. GATA3 expression in morphologic subtypes of breast carcinoma: a comparison with gross cystic disease fluid protein 15 and mammaglobin. *Ann Diagn Pathol.* 2015;19(1):6-9.
87. Liu GF, Yang Q, Haffty BG, et al. Clinicalpathologic features and long-term outcomes of tubular carcinoma of the breast compared with invasive ductal carcinoma treated with breast conservation therapy. *Int J Radiat Oncol Biol Phys.* 2009;75(5):1304-8.
88. A. Koh VCY, Ng CCY, Bay BH, et al. The utility of a targeted gene mutation panel in refining the diagnosis of breast phyllodes tumours. *Pathology.* 2019;51(5):531-4.
89. Koufopoulos N, Goudeli C, Syrjos J, et al. Mucinous cystadenocarcinoma of the breast: the challenge of diagnosing a rare entity. *Rare Tumors.* 2017;9(3):7016.
90. Nayak A, Bleiweiss IJ, Dumoff K, et al. Mucinous cystadenocarcinoma of the breast: report of 2 cases including one with longterm local recurrence. *Int J Surg Pathol.* 2018;26(8):749-57.
91. Petersson F, Pang B, Thamboo TP, et al. Mucinous cystadenocarcinoma of the breast with amplification of the HER2-gene confirmed by FISH: the first case reported. *Hum Pathol.* 2010 ;41(6):910-3.
92. Kucukzeybek BB, Yigit S, Sari AA, et al. Primary mucinous cystadenocarcinoma of the breast with amplification of the HERZ gene confirmed by FISH - case report and review of the literature. *Pol J Pathol.* 2014;65(1):703.
93. Seong M, Ko EY, Han BK, et al. Radiologic findings of primary mucinous cystadenocarcinoma of the breast: a report of two cases and a literature review, *J Breast Cancer.* 2016;19(3):330-3.