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Commentary

Dank and Pasty-Mucinous Cystadenocarcinoma Breast

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Mucinous cystadenocarcinoma breast emerges as an extremely exceptional, primary epithelial neoplasm arising within breast parenchyma. The epithelial carcinoma is constituted of tall columnar cells pervaded with abundant intracytoplasmic mucin and uniform, basally located nuclei. In contrast to variants such as mucinous carcinoma or colloid carcinoma breast with singularly extracellular mucin or signet ring cell carcinoma with specifically intracellular mucin, tumour cells display significant dispersal of extra-cytoplasmic mucin.

Mucinous cystadenocarcinoma breast implicates adult female subjects and may appear within 49 years to 96 years with mean age of disease emergence at 58 years to 68 years [1,2].

Grossly, mucinous cystadenocarcinoma breast expounds as a multi-cystic lesion simulating ovarian cystadenocarcinoma, pancreatic cystadenocarcinoma, appendicular cystadenocarcinoma or cystic hyper-secretory carcinoma of breast. Alternatively, solid lesions may be discerned indicative of columnar cell mucinous carcinoma. Tumour magnitude is variable and may extend up to 19 centimetres [1,2].

Upon microscopy, neoplasm is preponderantly configured of cystic spaces layered by bland, tall columnar epithelial cells impregnated with abundant intracytoplasmic mucin. Tumour cells exhibit stratification, tufting and articulation of papillary structures. Cytological atypia is variable. Tumour cells depict gradual decimation of intracytoplasmic mucin with cellular transition into eosinophilic squamoid epithelial cells which appear to induce focal tumour invasion [2,3].

Columnar cell variant of mucinous cystadenocarcinoma breast is configured of loose aggregates of spherical and convoluted glandular structures. Neoplastic glandular configurations are layered by tall columnar mucinous epithelium wherein epithelial cells are pervaded with bland nuclei with basal location. Tumour cells display intracellular mucin along with extracellular dispersal of mucin [2,3].

Gene	Type of mutation	Mutation site
PIK3CA	Missense	c.3140A
KRAS	Missense	c.35G
MAP2K4	Frameshift mutation	c.257_258del
RB1	Nonsense mutation OR frameshift deletion	c.277C OR c.2518delG
KDR	Missense	c.521G
PKHD1	Missense	c.6453G
TERT	Missense	c.1006G
TP53	Missense	c.476C
BAP1	Frameshift deletion	c.362delG

Table 1: *Genetic profile of mucinous cystadenocarcinoma breast [2,3].*

Score	(a)	(b)	(c)
1 point	0-5	0-9	0-11
2 points	6-11	10-19	12-22
3 points	11+	20+	23+

Table 2: *Quantifiable mitotic figures in proliferating zones/10hpf [2,3]. (a) Field diameter of 0.44 millimetres. (b) Field diameter of 0.59 millimetres. (c) Field diameter of 0.63 millimetres.*

Stage	T score	N score	M score
0	Tis	N0	M0
Stage I			
IA	T1	N0	M0
IB	T0	N1(mi+)	M0
IB	T1	N1(mi+)	M0
Stage II			
IIA	T0	N1	M0
IIA	T1	N1	M0
IIA	T2	N0	M0
IIB	T2	N1	M0
IIB	T3	N0	M0
Stage III			
IIIA	T0	N2	M0
IIIA	T1	N2	M0
IIIA	T2	N2	M0
IIIA	T3	N1 or N2	M0
IIIB	T4	N0, N1 or N2	M0
IIIC	Any T score	N3	M0
Stage IV			
IV	Any T score	Any N score	M1

Table 3: *Pathologic staging of invasive carcinoma breast (NOS) [3,4].*

Mucinous cystadenocarcinoma breast appears immune reactive to CK7 and exceptionally to oestrogen receptors (ER).

Tumour cells are immune non reactive to CK20, CDX2, oestrogen receptors (ER) and progesterone receptors (PR).

Ki67 proliferative index appears elevated, preponderantly > 30% [4,5].

Mucinous cystadenocarcinoma breast requires segregation from neoplasms as colloid carcinoma, mucinous carcinoma, cystic hyper-secretory carcinoma or a metastatic tumour invading breast parenchyma from distant primaries [4,5].

Mucinous cystadenocarcinoma breast can be appropriately alleviated by surgical resection of the neoplasm. Adjuvant chemotherapy and radiotherapy may be beneficially adopted.

Hormone therapy and targeted therapy for HER2 receptors may be employed for HER2+ neoplasms with concordant reactivity to hormone receptors [6,7].

Tumour reoccurrence may emerge as ductal carcinoma *in situ* (DCIS) with minimal invasion of ~5 millimetre magnitude into circumscribing breast parenchyma and may be subjected to mastectomy and axillary lymph node dissection along with or devoid of adjunct therapy.

Mucinous cystadenocarcinoma breast demonstrates extended possibility of localized tumour reoccurrence. Emergence of distant metastasis remains debatable [6,7].

Akin to invasive ductal carcinoma breast, factors contributing to prognostic outcomes appear as tumour magnitude, tumour grade, representation of oestrogen receptors (ER), progesterone receptors (PR), HER2, Ki-67 proliferative index levels, status of regional lymph nodes, vascular invasion and overexpression of p53 protein [6,7].

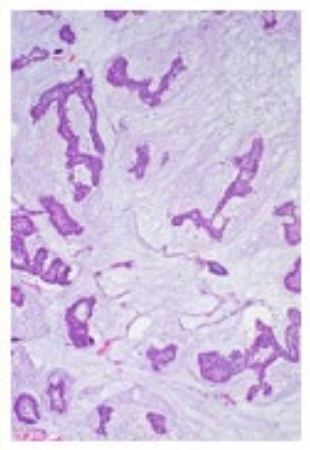

Figure 1: *Mucinous cystadenocarcinoma depicting cords, clusters and papillary structures layered by tall columnar epithelium permeated with abundant intracytoplasmic mucin and uniform, basal nuclei. Significant extracellular mucin is observed [8].*

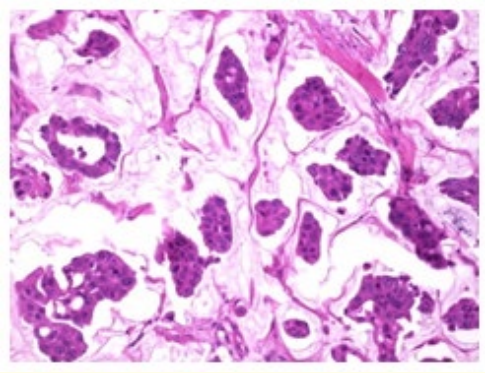

Figure 2: *Mucinous cystadenocarcinoma delineating aggregates of tall columnar cells permeated with abundant intracytoplasmic mucin and variable cytological and nuclear atypia. Moderate extra-cytoplasmic mucin is observed [9].*

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8. Image 1 Courtesy: Libre pathology.

9. Image 2 Courtesy: Webpathology.com.

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