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Krukenberg Tumor – An Enigmatic Entity – Case Report with Emphasis on The Role Of Frozen Section.

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ABSTRACT

Krukenberg tumor is an uncommon metastatic tumor of ovary.For establishing an accurate diagnosis, histopathological examination is needed, however intraoperative frozen section can help and guide in optimal surgical management. We describe Krukenberg tumor in a 30 year old female where diagnosis was given on the intraoperative frozen section. She underwent hysterectomy and bilateral salpingo-ovariotomy. On further evaluation she was diagnosed with colonic adenocarcinoma.

Keywords- Frozen section, Krukenberg, Metastasis, Ovary

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INTRODUCTION

Krukenberg tumor (KT) is a metastatic tumor of the ovary with primary tumor found predominantly in the gastrointestinal tract (GIT). This is a relatively rare neoplasm and accounts for approximately 1-2% of all ovarian malignancies[1].In nearly 80% cases bilateral ovarian involvement has been documented. KT is usually bilateral,characterized grossly by solid nodular enlargement of the ovaries and microscopically by a diffuse infiltration by signet ring cells with cytoplasmic mucin [2].Many times,the primary tumor is not found until the patient is diagnosed with KT and occasionally, the primary tumor is never found [3].Intraoperative frozen section has immensely helped in establishing an early diagnosis and guiding optimal surgical management of KT. It is very important to distinguish this tumor from other primary ovarian malignancies because of significantly different treatment protocols, chemotherapy response and prognosis [4]..

CASE DETAIL

A 30 year old multiparous female complained of pain abdomen andper vaginal spotting since 4 months. On examination, 7x7 cm mobile mass identified in right iliac region. On per vaginal examination uterus was normal in size, fullness present in anterior and right fornix along with a mobile, non-tender mass palpable in the right fornix. Computerized tomographyshowed bilateral ovarian heterogeneous solid cystic lesions suggestive of ovarian neoplasm (Figure 1). Hematology and serology parameters were normal. Exploratory laparotomy was planned and right adnexalmass measuring 12x5.5x5.5cmwas sent for intraoperative frozen section. It showed tumor composed of polygonal cells with abundant eosinophilic to clear vacuolated cytoplasm, round to oval peripherally placed nuclei, vesicular chromatin, prominent nucleoli, few multinucleated & bizarre forms, frequent mitosis, arranged in acinar and glandular pattern in a spindle cell stroma suggestive of Krukenberg tumor (Figure 2,3).Following which subtotal hysterectomy and salpingo-ovariotomy was done (Figure 4). Permanent paraffin sections showed similar histology. Tumor cells were positive for mucin stain (Figure 5,6,7). On immunohistochemistry(IHC), tumor cells were positive for CK20 and CDX2, and negative for CK7, hence suggesting primary of colonic origin (Figure 8,9,10). On further evaluation she was found to havecolonic adenocarcinoma(Figure 11). Patient was referred to oncology for palliative chemotherapy.

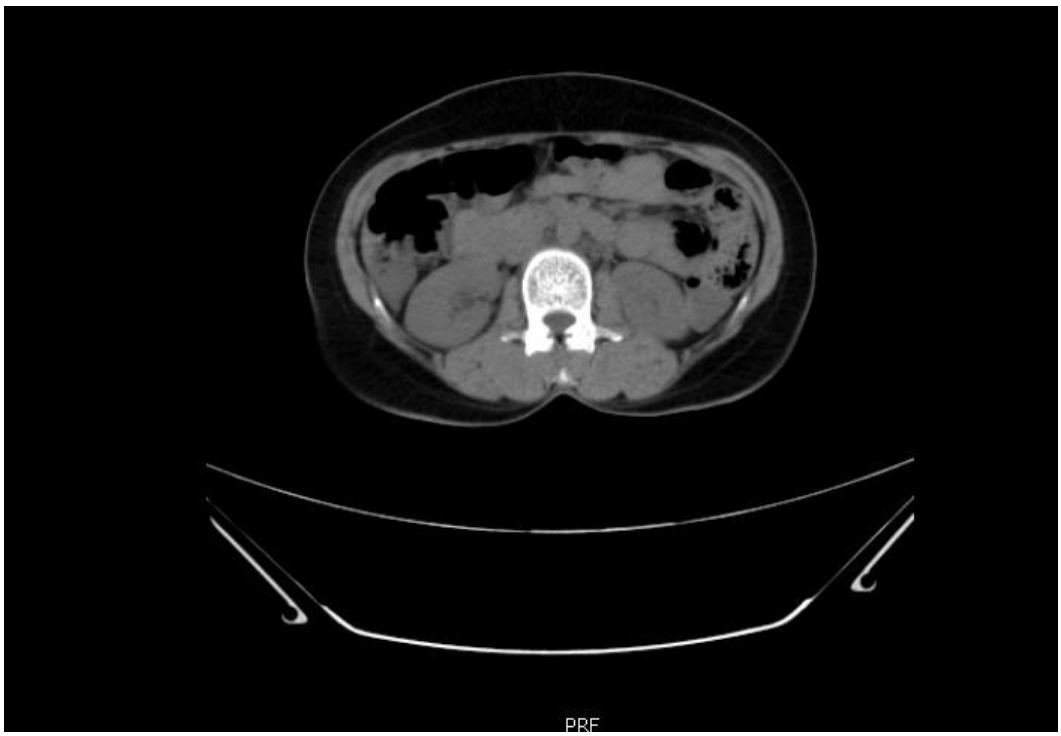

Figure 1- CT- Bilateral ovarian heterogenous solid cystic lesion

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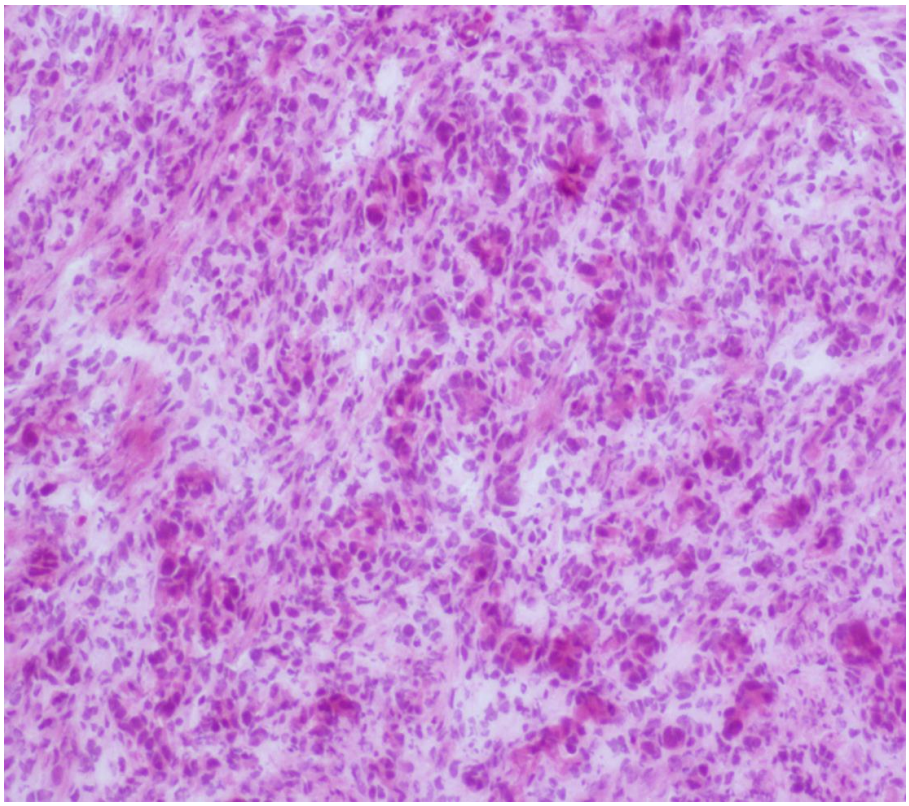

Figure 2- Frozen section, Tumor cells arranged in acini Rapid H&E X 100

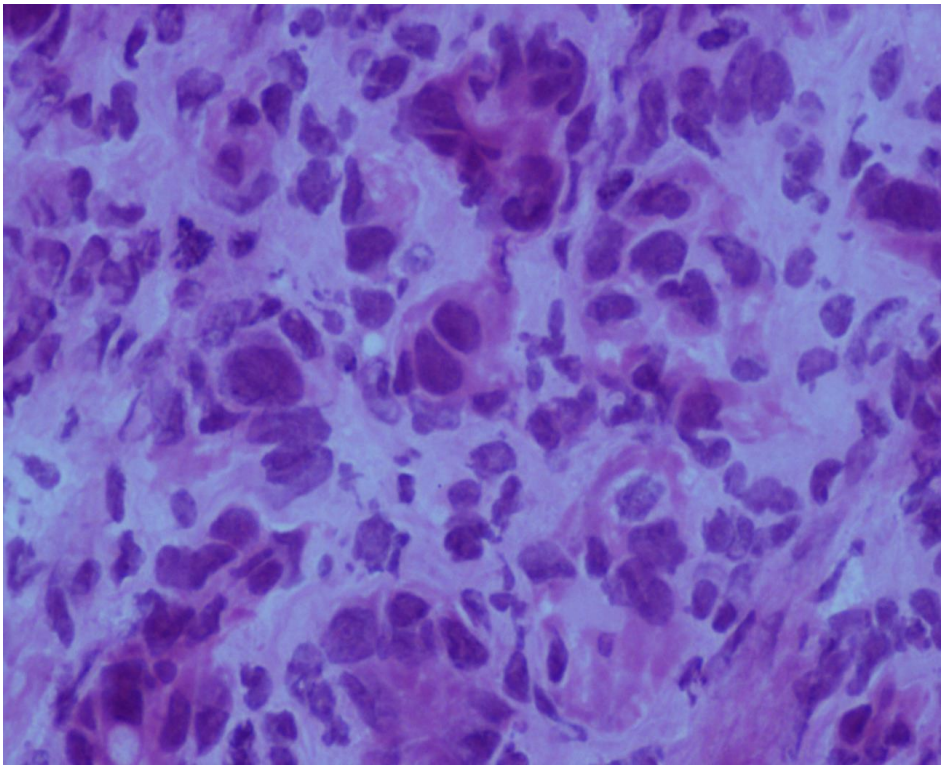

Figure 3- Frozen section, Malignant polygonal tumor cells Rapid H&E X 400

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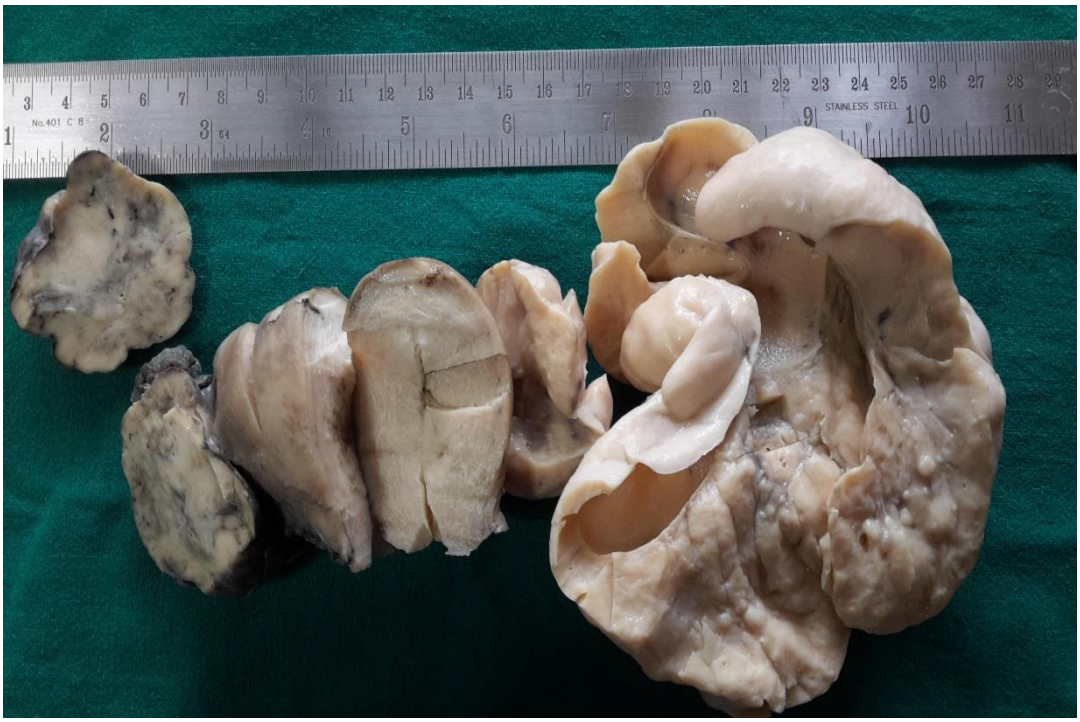

Figure 4- Gross- C/S of ovaries showing solid, cystic and hemorrhagic areas

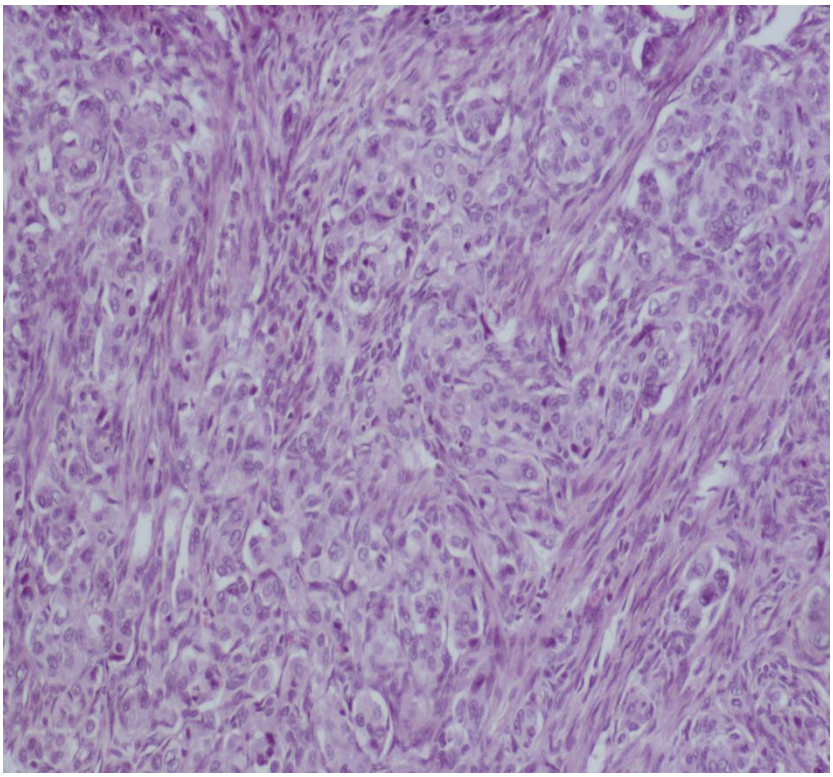

Figure 5- Tumor arranged in acini and glandular pattern H&E X100

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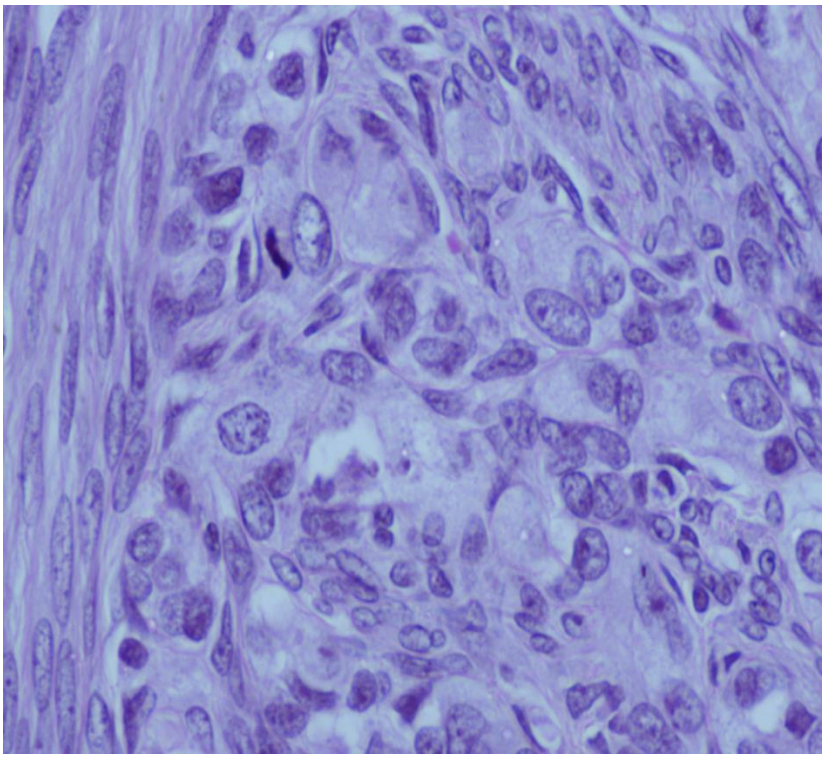

Figure 6- Abundant eosinophilic to clear vacuolated cytoplasm, vesicular nuclei, mitosis H&E X400

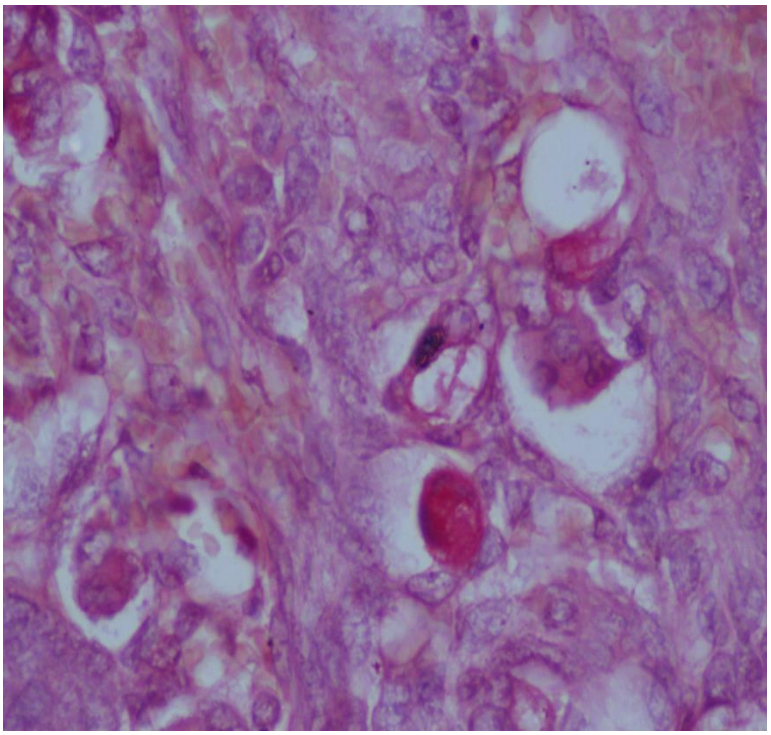

Figure 7- Tumor cells positive for Mucicarmine MC X400

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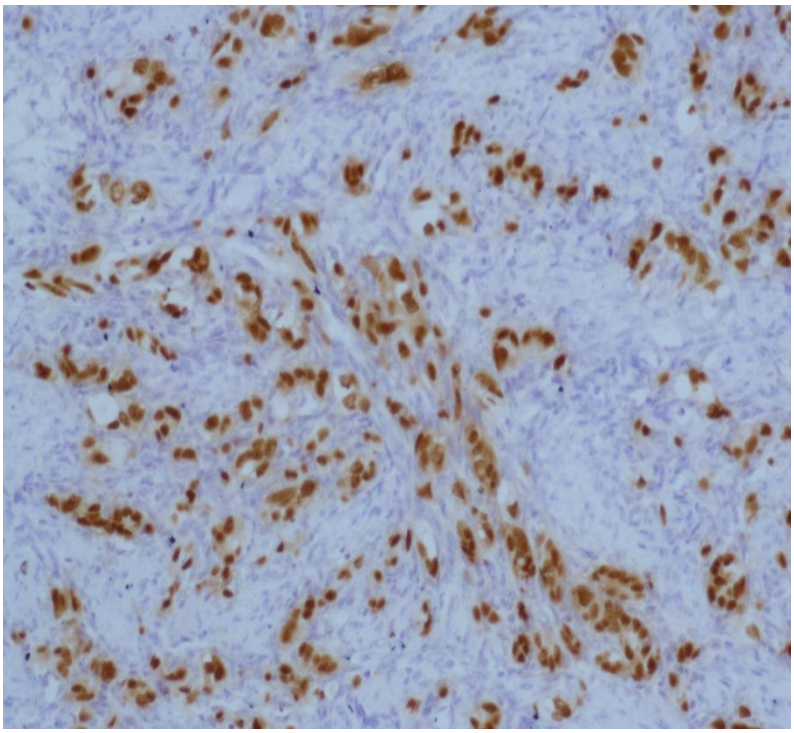

Figure 8- CK-20 Positive in tumor cells X100

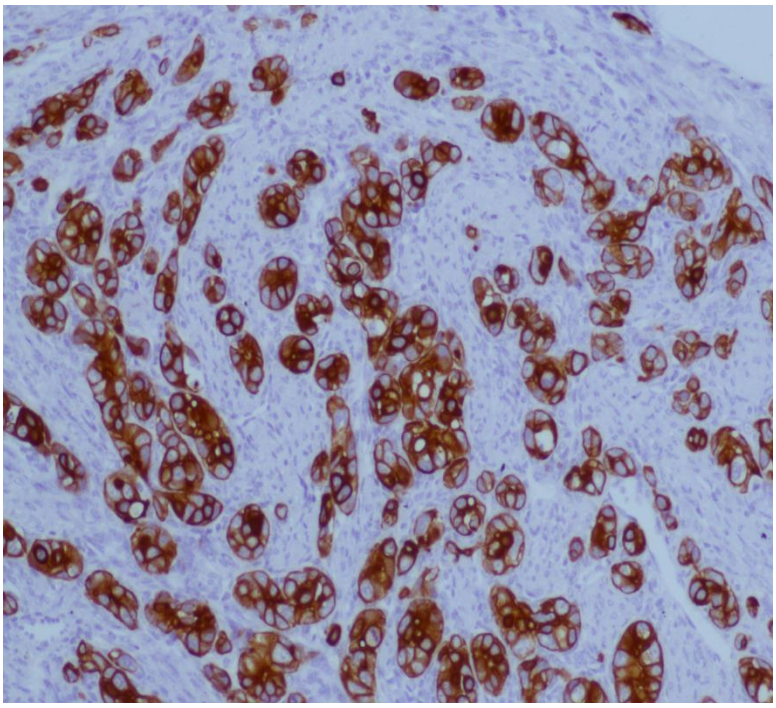

Figure 9- CDX2 Positive in tumor cells X100

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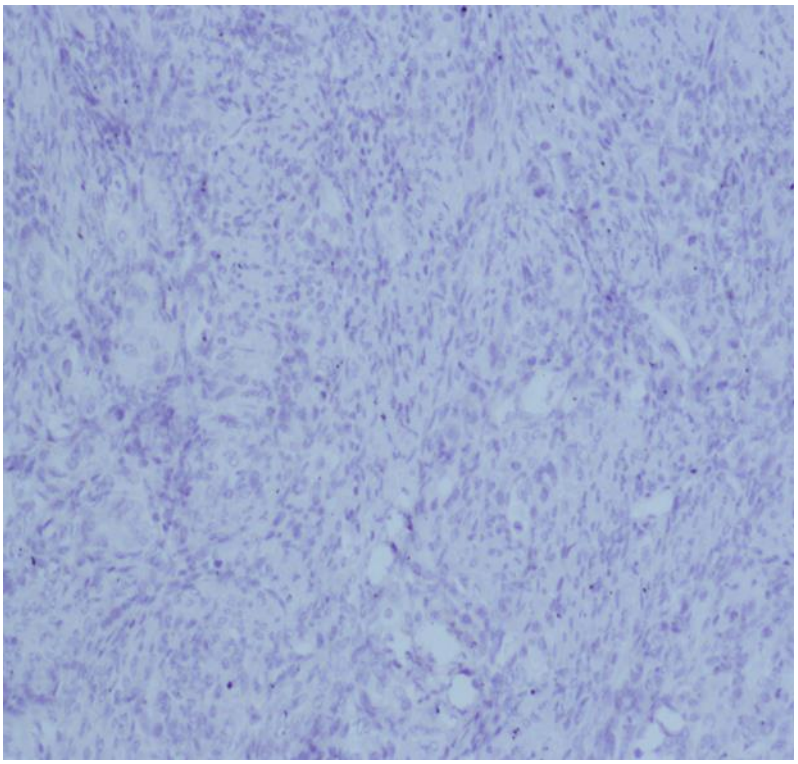

Figure 10- CK-7 Negative in tumor cells X100

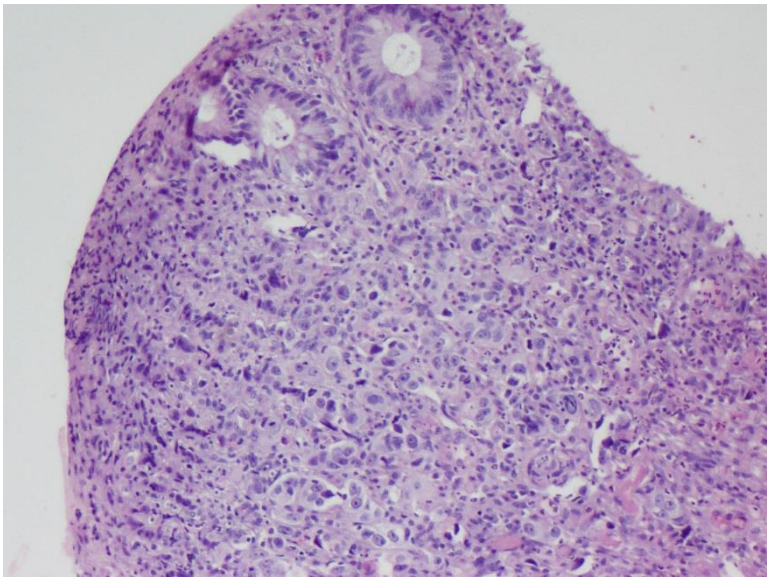

Figure 11- Colonic glands overlying adenocarcinoma H&E X100

DISCUSSION

KT, a metastatic adenocarcinoma of the ovary, was first described in the year 1896, however the true metastatic nature of this lesion was established later [5]. Stomach is the most common primary site for KT (70% cases), followed by colon, appendix and breast. Rarely primary from gallbladder, biliary tract, pancreas, small intestine, ampulla of vater, cervix, and urinary bladder/urachus have also been reported[6].

KT occurs in younger females with an average age of affection being 45 years[7].Patients present with the symptomsof abdominal pain, distension, ascites,bloating pelvic pain and menstrual irregularities[8]. Clinically it is very difficult to determine the nature of ovarian or adnexal neoplasm. At times even serological,

radiological and intraoperative findings are also not very precise. Hence the intraoperative diagnostic procedures like frozen section are extremely useful as they provide provisional diagnosis, hereby guiding the extent of surgery required forthe patient.Frozen section is a widelyused reliable diagnostic procedure in this setting with an overall accuracy of 86%-97%[9]. Our case was also diagnosed on frozen section which immensely helped in the optimal management of our patient.

On gross examination, ovaries are usually asymmetrically enlarged with a bosselated surface, smooth capsule, no adhesions or peritoneal deposits. Cut section is solid, grey white with occasional cystic area. On histology, KT is composed of epithelial and stromal components. The epithelial component is composed of mucinous signet ring cells with eccentric hyperchromatic nucleiarranged in nests, tubules, acini, trabeculae or cords[7,10].IHC playa a very important role in distinguishing primary ovarian malignancies from metastatic carcinomas. Cytokeratins 7 and 20 (CK7 and CK20) antibodies are most commonly used. Primary ovarian tumors are immunoreactive to CK7 (90%–100% cases) but usually not to CK20. On the other hand, metastatic GIT carcinomas tend to be less frequently positive for CK7 (55%), however shows positivity for CK20 in nearly 70% cases. Colorectal adenocarcinomas are negative for CK7 but strongly positive for CK20 in most cases. Tumors ofappendiceal origin are positive for CK20 but also show reactivity for CK7in nearly 50% cases. Hence, a CK7+/CK20- immune profile favors a primary ovarian carcinoma, whereas a $CK7^{-}/CK20^{+}$ or $CK7^{+}/CK20^{+}$immunophenotype favor a metastatic GIT carcinomas.Further antibodies like carcinoembryonic antigen and CDX2 can be used along with CK7 and CK20 to determine the precise origin of primary[7]. In our case $CK7^{-}/CK20^{+}$along with CDX2+ helped in determining the colorectal origin of the primary.

KT is found to have high mortality rate with majority of patients not surviving beyond two years of diagnosis. It has a median 5-year survival of 14 months.KT has overall poor prognosis and considered even worse if the primary is unidentified. Presently, there is no optimal treatment protocol for KT. Surgery is reserved for patients with limited metastasis confined to the ovaries[7], however Cheong et al. in their study found the median survival for patients undergoing metastatic resection was significantly more in comparison to the non-resection control group[11]. In this regard further studies are needed to decide the optimal role of surgery and precise treatment protocol forthis enigmatic tumor.

CONCLUSION

KT is rare metastatic tumor of ovary, often seen in young females and has got a poor prognosis. It is essential to rule out other primary ovarian malignancies to avoid the misdiagnosis and mismanagement of this tumor.Frozen section is known to play key role in the intraoperative assessment of ovarian lesions. High clinical suspicion and accurate intraoperative diagnosis in cases of KTs can guide the extent of surgery to be performed, hence improving the overall survival.

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