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Case report

Mixed squamous and clear cell ovarian adenocarcinoma arising from endometriosis in a 71 year old patient

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1. Introduction

Ovarian cancer is the second most common malignancy of the female reproductive tract in the United States. Subtypes are divided into germ cell cancers (10 %), stemming from the oocyte, and epithelial cell cancers (90 %), which are more common in later life and are associated with poor prognosis due to late diagnoses and nonspecific clinical presentations (Torre et al., 2018). Epithelial cell cancers are thought to arise from extraovarian tissues that embed in the ovary and undergo malignant transformation (Torre et al., 2018). This includes Fallopian tube epithelial deposition that causes serous carcinoma, transitional epithelium from the tubo-peritoneal junction causing mucinous carcinoma, and endometriomas on the ovary leading to clear cell carcinoma, adenocarcinoma, and rarely, squamous cell carcinoma (Torre et al., 2018). Ovarian Squamous Cell Carcinoma (SCC) is a rare form of ovarian cancer that comprises less than 1 % of all ovarian cancer diagnoses. Ovarian SCC most often arises from malignant transformation of one cell layer in a mature cystic teratoma (Roxburgh & Glasspool, 2014; Gadducci et al., 2021). Less commonly, they arise from an endometrioma or Brenner tumor (Srivastava et al., 2017). The rarest form of SCC is a pure ovarian SCC, of which only 30 cases have been reported (Srivastava et al., 2017).

Regardless of etiology, squamous cell carcinoma of the ovary carries a particularly poor prognosis with median survival time of only 26 months, compared to the more common high grade serous ovarian adenocarcinoma, which has median survival of 50 months (Zhang & Ma, 2020). Pathologic findings suggestive of ovarian SCC necessitate staging and aggressive management at time of diagnosis.

2. Patient presentation

A 71 year old Chinese G2P1 with history of hypertension and hyperlipidemia presented to her gynecologist with 10 days of non-radiating, sharp, right lower quadrant pain and one month of lower abdominal bloating. She had no postmenopausal bleeding, no changes in bowel movements, and no changes in urination. She had no history of abnormal pap smears and was a lifetime nonsmoker. Menarche was at age 15 and menopause at age 53. She had one vaginal delivery at age 26. She used oral contraceptive pills for 26 years and had no history of in vitro fertilization drug use or hormone replacement therapy. She never had abdominal or pelvic surgery. She had no family or personal history of breast or gynecologic cancer. A large pelvic mass was palpated on exam.

CT imaging revealed a 22.5 cm × 14.0 cm × 20.9 cm cystic pelvic mass appearing to originate from the right ovary and extending to the midline (Fig. 1). There was an irregular soft tissue component within the mass measuring 7.6 cm × 3.1 cm × 4.0 cm with calcifications and nodular septations. GI tract including pancreas appeared normal. Patient was then referred to gynecologic oncology. Lab work revealed an elevated CA 19–9 of 2,392.5 and elevated CA-125 of 211. CEA was within normal limits at 1.4. Because this constellation of findings was concerning for ovarian malignancy, exploratory laparotomy, total abdominal hysterectomy with bilateral salpingo-oophorectomy and staging was planned within two weeks.

Intraoperatively, a 25 cm cyst was found, originating from the right ovary. Pelvic washings were collected. The walls of the cyst were adherent to surrounding structures, notably the appendix, sigmoid

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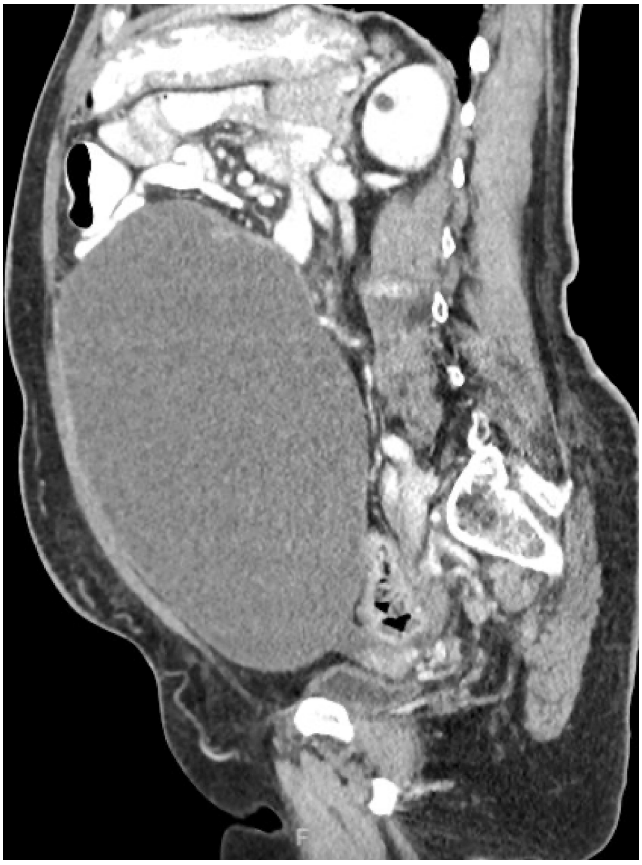

Fig. 1. Sagittal view of CT scan. Large cystic mass most likely arising from the right ovary extending to the mid abdomen measuring 22.5 × 14 × 20.9 cm.

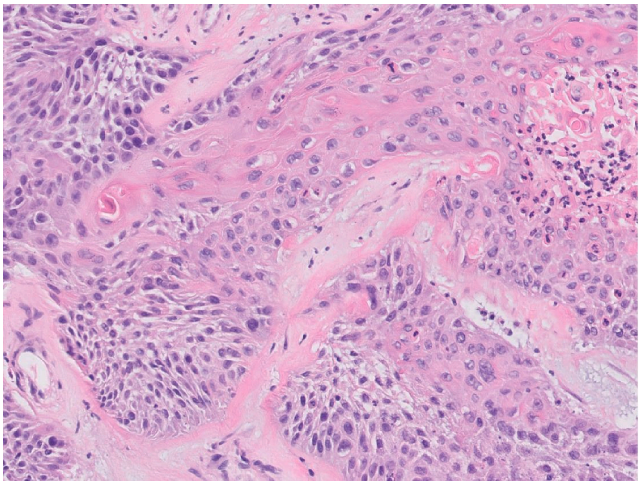

Fig. 2. Ovarian squamous cell carcinoma. An irregular island of pleomorphic squamous cells, exhibiting intercellular bridges, focal keratin production and necrosis. (H&E, x200).

colon, and right pelvic side wall. The cyst was drained in a contained manner, and the cyst walls were subsequently dissected from the appendix, sigmoid colon, and pelvic side wall. An appendectomy was performed along with cyst removal. There was no spillage of cyst contents into the abdomen. This mass was sent for frozen section, which revealed an invasive SCC. In order to mobilize the uterus, right ureterolysis was also performed, with noted vermiculation thereafter. The cyst, bilateral ovaries and tubes, and the uterus and cervix were removed. Omentectomy was performed through mobilization at the transverse colon for staging purposes. Finally, a right pelvic lymph node dissection was performed. Contralateral pelvic lymph node and paraaortic lymph node dissection were not performed because these procedures would add morbidity without change in management, given that patient would be receiving adjuvant chemotherapy given suspected aggressive histology of SCC. Hemostasis was achieved with 500 mL estimated blood loss. Postoperative course was uncomplicated.

Pelvic washings were negative for malignant cells. Pathologic examination revealed FIGO stage IA ovarian cancer of the right ovary. Histology showed mixed carcinoma with a clear cell carcinoma component (25 %) and a squamous cell carcinoma component (75 %). The clear cell component showed positive staining for HNF1β and Napsin A. The squamous component showed intercellular bridges and keratin pearl formation (Fig. 2). Due to the presence of an adjacent endometrioma, it was postulated that both these tumor components arose from antecedent endometriosis. The ovarian capsule was tumor-free and the bilateral Fallopian tubes, left ovary, right pelvic lymph nodes, omentum, and appendix were benign.

After presentation at institution-wide tumor board, conclusion was made that the presence of clear cell and squamous cell carcinoma classified this patient's early stage ovarian cancer as high risk for recurrence, and she was recommended to undergo adjuvant treatment with carboplatin and paclitaxel every 3 weeks for 6 cycles. Routine pre-chemotherapy hepatitis serologies noted positive hepatitis B core antibody, and patient was begun on entecavir prior to initiation of chemotherapy. Patient adverse effects did not affect her activities of daily living. Patient underwent genetic testing that showed a variant of uncertain significance in adenomatous polyposis coli (APC) and epidermal growth factor receptor (EGFR) genes. At time of this submission, patient is 4 months from completion of adjuvant chemotherapy and has no evidence of disease based on physical exam and imaging. CA 19 9 normalized to 10, and CA 125 normalized to 14. Patient was continued on entecavir for 6 months following completion of chemotherapy to prevent hepatitis B flare-up.

3. Discussion

As of 2019, only 36 cases of ovarian SCC had been reported in the English language literature (Koufopoulos et al., 2019). Most cases of squamous cell carcinoma (SCC) are due to metastasis or due to secondary transformation of mature cystic teratomas (MCTs), Brenner tumors, or foci of transformation within endometriomas (Zhang & Ma, 2020).

Secondary transformation of an MCT occurs when the ectodermal germ layer of a cystic teratoma undergoes metaplasia. 80 % of ovarian SCC's are from these transformations (Maharjan, 2019; Hackethal et al., 2008). Another common transformation occurs within an endometrioma, which is the posited mechanism in this patient. Ectopic endometrial tissue on or within the ovary has been rarely reported to undergo malignant transformation, resulting in ovarian SCC within, or in a background of, endometriosis (Koufopoulos et al., 2019). Ovarian SCC that originates from endometriosis likely comes about through neoplastic squamous transformation of the endometrial-type epithelium (Acien et al., 2010). It has been suggested that ovarian SCC that originates in endometriosis tends to carry a worse overall survival than ovarian SCC that presumably transforms from a dermoid cyst (Acien et al., 2010). Fifteen of these rare cases were reported as of 2009 (Torre et al., 2018; Acien et al., 2010; Xu and Li, 2018). HPV and cervical dysplasia have also been associated with SCC of the ovary (Hackethal et al., 2008; Mai et al., 1996; Wu et al., 2003). Retrospective reviews of SCC cases have shown 27–40 % of women with primary squamous cell carcinomas of the ovary have had previous or current cervical intraepithelial neoplasia (CIN) or vulvar intraepithelial neoplasia (VIN) (Koufopoulos et al., 2019; Park et al., 2010; Xi et al., 2022). The proposed mechanism of ovarian carcinoma in the setting of HPV infection

Table 1
Review of ovarian squamous cell carcinoma in the literature.

Author	Year	Age	Pathology	FIGO Stage	Surgical Intervention	Chemotherapy	Outcome
McCullough (1946)	1946	–	SCC within endometriotic cyst	Stage IA	BSO	N/A	DOD at 6 months
Tetu et al. (1987)	1987	45	Ovarian SCC after TAH for endometriosis	Stage III, grade 3	Tumor reduction*	Chemotherapy*	DOD at 5 months
Naresh et al. (1991)	1991	62	Ovarian SCC associated with endometrioma		TAH, LSO, debulking of R ovarian mass, partial omentectomy	Multiagent chemotherapy	DOD at 2 months
Campagnutta et al. (1994)	1994		Ovarian SCC associated with endometrioma		RH	Radiotherapy	DOD at 11 months
Eltabbakh et al. (1998)	1998	31	Ovarian SCC associated with endometrioma	Stage IV	Cytoreductive surgery	Paclitaxel-cisplatin 12 cycles (every 4 weeks)	Alive without disease progression at 24 months
Ohtani et al. (2000)	2000	53	Well-moderately differentiated SCC with focal endometriosis		RH, BSO, low anterior colectomy	POMB (cisplatin, vincristine, mitomycin C, bleomycin) 2 cycles; paclitaxel-carboplatin 5 weekly cycles	Reduction in tumor volume by 78 % at 2 months
Balat et al. (2001)	2001	40	Bilateral primary ovarian SCC		TAH, BSO, PLND, infracolic omentectomy, appendectomy, right nephrectomy	multiagent-chemotherapy	DOD at 24 months
Chien et al. (2005)	2005	63	High-grade SCC	Stage IV, grade 3	TAH, BSO, bilateral PLND, tumor resection, omentectomy	Paclitaxel-cisplatin 6 cycles	DOD at 7 months
Amjad and Pal (2008)	2008	31	Well differentiated ovarian SCC	Stage IIIc	TAH, BSO, PLND, PALND, supracolic TAH, BSO, sigmoid colectomy, terminal ileostomy, total omentectomy, small bowel resection	Cisplatin-etoposide 3 months	DOD at 3 months
Park et al. (2010)	2010	76	Well differentiated invasive ovarian SCC	Stage IIc, grade 1	TAH, BSO, PLND, PALND, supracolic omentectomy, appendectomy	Paclitaxel and platinum-based chemotherapy 5 cycles	Alive without disease progression at 90 months
Park et al. (2010)	2010	48	Invasive ovarian SCC	Stage IV, grade 3	TAH, BSO, PLND, PALND, supracolic omentectomy, appendectomy, debulking	Paclitaxel and platinum-based chemotherapy 3 cycles	Alive without disease progression at 9 months
Acien et al. (2010)	2010	46	Primary, moderately differentiated ovarian SCC associated with endometriosis	Stage IV	TAH,BSO, recto-sigmoidectomy, infracolic omentectomy, appendectomy, peritoneal wall biopsies	Paclitaxel-carboplatin 1 cycle	DOD at 70 days
Yamakawa et al. (2011)	2011	45	Moderately differentiated ovarian SCC	Stage IIIc	RH, BSO, PLND, PALND, rectal serosa tumor resection, omentectomy	Paclitaxel-carboplatin 6 cycles, paclitaxel weekly 5 cycles, irinotecan-mitomycin 3 cycles every 2 weeks	DOD at 16 months
Baughn et al. (2011)	2011	58	Moderately differentiated invasive ovarian SCC arising in continuity w/benign mucinous cyst		TAH, BSO, PLND, PALND, omentectomy	Paclitaxel-carboplatin 3 cycles	Alive without disease progression at 6 months
Park and Bae (2015)	2015	46	Pure ovarian SCC	Stage IVB	TAH, BSO, segmental sigmoid resection	Paclitaxel-carboplatin 6 cycles. Topotecan-cisplatin 3 cycles. Etoposide-ifosfamide 3 cycles	DOD at 12 months
Nakamura et al. (2015)	2015	71	Pure ovarian SCC	Stage IIb	Initial: RSO, uterine wall tumor resection. Post-chemo: TAH, LSO, PLND, PALND, partial omentectomy	Paclitaxel-carboplatin 2 cycles monthly; irinotecan 3 weekly cycles; Post-surgery: irinotecan 3 weekly cycles	Alive without disease progression at 18 months
Sharma et al. (2015)	2015	66	Moderately differentiated ovarian SCC	Stage IIIC	TAH, BSO, infracolic omentectomy, removal of right parietal wall mass	Radiation therapy with cisplatin	DOD at 2 months
Srivastava et al. (2017)	2017	30	Pure ovarian SCC	Stage IIIc	TAH, LSO, debulking of residual tumor, infra-colic omentectomy, ileal resection	Paclitaxel-cisplatin 7 cycles	DOD at 12 months
Mimura et al. (2017)	2017	50	Pure ovarian SCC	Stage IIB	En-bloc TAH, BSO, rectosigmoid colectomy, infracolic omentectomy, PLND, PALND	Paclitaxel-carboplatin	Alive without disease progression at 7 months
Xu and Li (2018)	2018	43	Poorly differentiated ovarian SCC		TAH, BSO, omentectomy	Paclitaxel-cisplatin (peritoneal injection) 3 cycles; paclitaxel-cisplatin (IV) 2 cycles; cisplatin-doxorubicin-cyclophosphamide 2 cycles	DOD at 16 months
Maharjan (2019)	2019	43	Moderately differentiated SCC arising from mature cystic teratoma	Stage IA	TAH, BSO	Carboplatin-based chemotherapy	Alive without disease progression at 6 months

(*continued on next page*)

Table 1 (*continued*)

Author	Year	Age	Pathology	FIGO Stage	Surgical Intervention	Chemotherapy	Outcome
This study	2023	71	Mixed ovarian carcinoma with clear cell carcinoma component (25 %) and SCC component (75 %)	Stage IA	RH, BSO, PLND, appendectomy, omentectomy	Paclitaxel-carboplatin, 6 cycles	Alive without disease progression at 8 months

Key: TAH = total abdominal hysterectomy; RH = radical hysterectomy; PALND = para-aortic lymph node dissection; PLND = pelvic lymph node dissection; BSO = bilateral salpingo-oophorectomy; RSO = right salpingo-oophorectomy; LSO = left salpingo-oophorectomy; B/L = bilateral; Q3W = every 3 weeks; DOD = dead of disease.

* Data obtained from Acien et al.

include contiguous spread from cervix to ovary, angioinvasion from the cervix, and the "field effect" through which simultaneous HPV infection of similar tissue can trigger synchronous transformation to primary squamous cell carcinoma at distinct sites (Koufopoulos et al., 2019; Mai et al., 1996; Park et al., 2010).

Worsened outcomes for patients are in part due to the insidious and nonspecific onset of symptoms, thereby delaying initial diagnosis. The most common presenting symptom of primary ovarian SCC is new onset abdominal pain (Koufopoulos et al., 2019; Acien et al., 2010). Ovarian cancer has been mistaken for pelvic inflammatory disease (PID) due to similarities in hypogastric, suprapubic, and lower quadrant tenderness evolving over weeks-months (Acien et al., 2010). Suspicion for malignancy should be high in all older women presenting with vague abdominal pain, distention, or palpable adnexal masses. SCC in particular is locally aggressive and commonly adheres to or invades adjacent structures including the uterus, colon, appendix, kidney, ureters, and pelvic side wall (Park et al., 2010). As a result, presenting symptoms may include vaginal bleeding, rectal bleeding, weight loss, constipation, urinary retention, fever, or cough (Koufopoulos et al., 2019). Serologic analysis may show elevated CA125 and SCC antigen and can be useful for raising suspicion of SCC in the setting of an adnexal mass (Xi et al., 2022).

Surgical intervention in the form of cytoreduction, hysterectomy, bilateral salpingo-oophorectomy, and omentectomy is almost always recommended as the first step in management of resectable suspicious ovarian masses. Grossly, these tumors may appear necrotic, of mixed solid and cystic material, and can be adhered to surrounding structures, as in our case (Koufopoulos et al., 2019; Acien et al., 2010). Surgical resection of the appendix, colon, bladder, kidneys, omentum, ureters, or pelvic side wall may be necessary in these cases (Koufopoulos et al., 2019). Although lymph node biopsy is frequently done for staging purposes, data has shown that lymphadenectomy carries no survival benefit. Average survival with and without lymphadenectomy are not statistically significantly different (Koufopoulos et al., 2019).

Surgical specimens may have histology consistent with squamous cell carcinoma including pathognomonic findings of intercellular bridges and keratin pearls (Koufopoulos et al., 2019). Other phenotypes include papillary structures, polypoid histology, cystic findings and necrosis (Koufopoulos et al., 2019). Immunohistochemistry can reveal molecular signatures including p16, hMLH1, hMSH2, hMSH6, PMS2 (Xi et al., 2022). In this case report, the patient had expression of HNF1β and Napsin A, both markers associated with ovarian clear cell carcinoma (Chandra et al., 2021; Travaglino et al., 2022). There were additionally foci of vimentin expression, a marker that correlates with the epithelial to mesenchymal transition and tumor aggressiveness.

Following surgical resection, adjuvant therapy may be offered. However, due to the small number of primary ovarian SCC cases, there is not a robust body of evidence for specific regimens postoperatively. The National Comprehensive Cancer Center (NCCN) does not provide guidelines for squamous cell carcinomas of the ovary (Armstrong et al., 2022). Most are managed with the same guidelines as other ovarian cancers. Most studies recommend that high grade serous ovarian carcinomas stage 1C or greater be treated with platinum-based chemotherapy and paclitaxel (Gadducci et al., 2021; Koufopoulos et al., 2019; Hackethal et al., 2008; Xu & Li, 2018), but National Comprehensive Cancer Center (NCCN) guidelines recommend that more aggressive histologies, of which clear cell carcinoma is one, also be treated adjuvantly with platinum-based chemotherapy. A systematic review in 2012 by Winter-Roach et al showed that adjuvant platinum-based chemotherapy is effective in prolonging survival of the majority of patients with IA disease with well-differentiated, encapsulated unilateral disease (Winter-Roach et al., 2012). Table 1 contains shows published cases of ovarian SCC and the treatments thereof. Out of the 21 case reports reviewed, all underwent some form of cytoreductive surgery. All except 1 case received adjuvant treatment, 2 received radiotherapy (Tetu et al., 1987; Mandal et al., 2015), and the remainder received adjuvant chemotherapy. Most patients who received specified chemotherapy were treated with platinum-based regimens. Those with stage IA disease, such as our patient, were dead of disease at 6 months (without any adjuvant chemotherapy) (McCullough et al., 1946), and alive without disease progression at 6 months (Maharjan, 2019).

Despite these interventions, prognosis of ovarian cancer remains poor (Amjad & Pal, 2008). A SEER study in 2020 compared squamous cell carcinoma of the ovary with high grade serous adenocarcinoma of the ovary. Median survival of SCC was 26 months compared to 50 months with serous carcinoma (Zhang & Ma, 2020). Notably, although 1–2 year survival for ovarian SCC was half that of serous carcinoma, by 5 years, survival actually slightly favored SCC, suggesting an early increase in mortality but longer survival for those who are caught early (Zhang and Ma, 2020). In another study of 32,185 women diagnosed with high grade serous ovarian carcinoma and squamous cell carcinoma of the ovary from 2000 to 2017, SCC presented earlier in the disease course but had decreased overall survival than its more common high grade serous counterpart (Amjad & Pal, 2008). Of these over 32,000 cases, only 206 were SCC, further reinforcing the rarity of this subtype of ovarian cancer and the limitations that exist in finding sufficient evidence to support treatment recommendations. Risk factors associated with worse disease outcome included older age, larger tumor size, bilaterality, and more advanced FIGO stage at time of diagnosis (Zhang & Ma, 2020).

This case represents one of a very limited number of reports of ovarian SCC. In this case, keratinizing squamous cell carcinoma component was found to comprise 75 % of the ovarian tumor, with the remaining 25 % clear cell carcinoma. Unlike 80 % of ovarian SCCs, this was not transformed within a mature cystic teratoma but rather from antecedent endometriosis. This patient came to attention early on in the disease process with histology revealing FIGO stage 1A cancer. Resection with clear margins was achieved and subsequent management included a standard ovarian cancer carboplatin/paclitaxel regimen necessitated by the presence of high risk components on histology.

Ovarian SCC represents a rare and aggressive histology that does not currently have an established standard of care treatment. Based on our review of the literature, we would recommend treating these patients with initially cytoreductive surgery if the chance of optimal cytoreduction is high. Thereafter, even in stage IA disease, we would recommend treatment with adjuvant platinum-based chemotherapy and close surveillance.

Written informed consent was obtained from the patient for

publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

CRediT authorship contribution statement

Alexandra Mills: Conceptualization, Writing – original draft. **Mona Saleh:** Conceptualization, Writing – original draft, Writing – review & editing. **Faruk Erdem Kombak:** Writing – original draft. **Matthew Flint:** Conceptualization, Writing – review & editing. **Valentin Kolev:** Writing – review & editing, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Acien, P., Abad, M., Mayol, M.J., Garcia, S., Garde, J., 2010. Primary squamous cell carcinoma of the ovary associated with endometriosis. Int. J. Gynaecol. Obstet. 108 (1), 16–20. https://doi.org/10.1016/j.ijgo.2009.08.019.

Amjad, A.I., Pal, I., 2008. De novo primary squamous cell carcinoma of the ovary: a case of a rare malignancy with an aggressive clinical course. J. Pak. Med. Assoc. 58 (5), 272–274.

Armstrong, D.K., Alvarez, R.D., Backes, F.J., Bakkum-Gamez, J.N., Barroilhet, L., Behbakht, K., Berchuck, A., Chen, L.-M., Chitiyo, V.C., Cristea, M., DeRosa, M., Eisenhauer, E.L., Gershenson, D.M., Gray, H.J., Grisham, R., Hakam, A., Jain, A., Karam, A., Konecny, G.E., Leath III, C.A., Leiserowitz, G., Liu, J., Martin, L., Matei, D., McHale, M., McLean, K., Miller, D.S., Percac-Lima, S., Remmenga, S.W., Schorge, J., Stewart, D., Thaker, P.H., Vargas, R., Hendrickson, A.W., Werner, T.L., Zsiros, E., Dwyer, M.A., Hang, L., 2022. NCCN Guidelines® insights: Ovarian cancer, version 3.2022: Featured updates to the NCCN guidelines. J. Natl. Compr. Canc. Netw. 20 (9), 972–980. https://doi.org/10.6004/jnccn.2022.0047.

Balat, O., Aydin, A., Camci, C., Kutlar, I., Buyukberber, S., 2001. Bilateral primary squamous cell carcinoma of the ovary: a case report of isolated metastasis to the lateral pelvic wall. Eur. J. Gynaecol. Oncol. 22 (6), 445–446.

Baughn, M.R., Plaxe, S.C., Weidner, N., 2011. Primary squamous carcinoma of the ovary likely arising from a monodermal cystic mucinous teratoma. Ann. Diagn. Pathol. 15 (6), 446–449. https://doi.org/10.1016/j.anndiagpath.2010.06.005.

Campagnutta, E., Sopracordevole, F., Spolaor, L., Doglioni, C., Parin, A., Scarabelli, C., 1994. Squamous cell carcinoma in ovarian endometriosis. A case report. J. Reprod. Med. 39 (7), 557–560.

Chandra, S., Srinivasan, S., Batra, J., 2021. Hepatocyte nuclear factor 1 beta: A perspective in cancer. Cancer Med. 10 (5), 1791–1804. https://doi.org/10.1002/cam4.3676.

Chien, S.C., Sheu, B.C., Chang, W.C., Wu, M.Z., Huang, S.C., 2005. Pure primary squamous cell carcinoma of the ovary: a case report and review of the literature. Acta Obstet. Gynecol. Scand. 84 (7), 706–708. https://doi.org/10.1111/j.0001-6349.2005.0383d.x.

Eltabbakh, G.H., Hempling, R.E., Recio, F.O., O'Neill, C.P., 1998. Remarkable response of primary squamous cell carcinoma of the ovary to paclitaxel and cisplatin. Obstet. Gynecol. 91 (5 Pt 2), 844–846. https://doi.org/10.1016/s0029-7844(97)00665-0.

Gadducci, A., Multinu, F., Cosio, S., Carinelli, S., Ghioni, M., Aletti, G.D., 2021. Clear cell carcinoma of the ovary: Epidemiology, pathological and biological features, treatment options and clinical outcomes. Gynecol. Oncol. 162 (3), 741–750. https://doi.org/10.1016/j.ygyno.2021.06.033.

Hackethal, A., Brueggmann, D., Bohlmann, M.K., Franke, F.E., Tinneberg, H.R., Munstedt, K., 2008. Squamous-cell carcinoma in mature cystic teratoma of the ovary: systematic review and analysis of published data. LancetOncol. 9 (12), 1173–1180. https://doi.org/10.1016/S1470-2045(08)70306-1.

Koufopoulos, N., Nasi, D., Goudeli, C., et al., 2019. Primary squamous cell carcinoma of the ovary. Review of the literature. J BUON. 24 (5), 1776–1784.

Maharjan, S., 2019. Mature cystic teratoma of ovary with squamous cell carcinoma arising from it. Clin. Case Rep. 7 (4), 668–671. https://doi.org/10.1002/ccr3.2062.

Mai, K.T., Yazdi, H.M., Bertrand, M.A., LeSaux, N., Cathcart, L.L., 1996. Bilateral primary ovarian squamous cell carcinoma associated with human papilloma virus infection and vulvar and cervical intraepithelial neoplasia. A case report with review of the literature. Am. J. Surg. Pathol. 20 (6), 767–772. https://doi.org/10.1097/00000478-199606000-00016.

Mc, C.K., Froats, E.R., Falk, H.C., 1946. Epidermoid carcinoma arising in an endometrial cyst of the ovary. Arch. Pathol. (Chic). 41, 335–337.

Mimura, K., Okada, A., Haraguchi, N., Sawada, K., Tomimatsu, T., Kimura, T., 2017. Pure primary ovarian squamous cell carcinoma perforating the rectum. Case Rep Obstet Gynecol. 2017, 9793086. https://doi.org/10.1155/2017/9793086.

Nakamura, Y., Kamei, T., Shinagawa, M., Sakamoto, Y., Miwa, I., 2015. Case of pure ovarian squamous cell carcinoma resistant to combination chemotherapy with paclitaxel and carboplatin but responsive to monotherapy with weekly irinotecan. J. Obstet. Gynaecol. Res. 41 (5), 809–812. https://doi.org/10.1111/jog.12631.

Naresh, K.N., Ahuja, V.K., Rao, C.R., Mukherjee, G., Bhargava, M.K., 1991. Squamous cell carcinoma arising in endometriosis of the ovary. J Clin Pathol. 44 (11), 958–959.

Ohtani, K., Sakamoto, H., Masaoka, N., Shimada, K., Kanaeda, T., Kurihara, M., Nagai, N., Satoh, K., 2000. A case of rapidly growing ovarian squamous cell carcinoma successfully controlled by weekly paclitaxel-carboplatin administration. Gynecol. Oncol. 79 (3), 515–518. https://doi.org/10.1006/gyno.2000.5985.

Park, J.W., Bae, J.W., 2015. Pure primary ovarian squamous cell carcinoma: A case report and review of the literature. Oncol. Lett. 9 (1), 321–323. https://doi.org/10.3892/ol.2014.2650.

Park, J.Y., Song, J.S., Choi, G., Kim, J.H., Nam, J.H., 2010. Pure primary squamous cell carcinoma of the ovary: a report of two cases and review of the literature. Int. J. Gynecol. Pathol. 29 (4), 328–334. https://doi.org/10.1097/PGP.0b013e3181c6d965.

Roxburgh, P., Glasspool, R., 2014. Squamous carcinoma of the ovary. Curr. Oncol. Rep. 16 (12), 413. https://doi.org/10.1007/s11912-014-0413-1.

Sharma, S.A., Zaheer, C.S., Mandal, A.K., 2015. An aggressive rare entity- Pure (de novo) primary squamous cell carcinoma of ovary: Review of literature and a case report. Clin. Cancer Invest. J. 4 (5), 682–686.

Srivastava, H., Shree, S., Guleria, K., Singh, U.R., 2017. Pure primary squamous cell carcinoma of ovary - A rare case report. J. Clin. Diagn. Res. 11 (5), QD01–QD2. https://doi.org/10.7860/JCDR/2017/16899.9771.

Tetu, B., Silva, E.G., Gershenson, D.M., 1987. Squamous cell carcinoma of the ovary. Arch. Pathol. Lab Med. 111 (9), 864–866.

Torre, L.A., Trabert, B., DeSantis, C.E., Miller, K.D., Samimi, G., Runowicz, C.D., Gaudet, M.M., Jemal, A., Siegel, R.L., 2018. Ovarian cancer statistics, 2018. CA Cancer J. Clin. 68 (4), 284–296. https://doi.org/10.3322/caac.21456.

Travaglino, A., Raffone, A., Arciuolo, D., et al., 2022. Diagnostic accuracy of HNF1beta, Napsin A and P504S/Alpha-Methylacyl-CoA Racemase (AMACR) as markers of endometrial clear cell carcinoma. Pathol. Res. Pract. 237, 154019 https://doi.org/10.1016/j.prp.2022.154019.

Winter-Roach, B.A., Kitchener, H.C., Lawrie, T.A., 2012. Adjuvant (post-surgery) chemotherapy for early stage epithelial ovarian cancer. Cochrane Database Syst. Rev. 3 (3), CD004706 https://doi.org/10.1002/14651858.CD004706.pub4.

Wu, Q.J., Guo, M., Lu, Z.M., Li, T., Qiao, H.Z., Ke, Y., 2003. Detection of human papillomavirus-16 in ovarian malignancy. Br. J. Cancer 89 (4), 672–675. https://doi.org/10.1038/sj.bjc.6601172.

Xi, Y., Zhang, M.L., He, C., et al., 2022. Primary ovarian squamous cell carcinoma: clinicopathological features and prognostic analysis of fifteen cases. Zhonghua Bing Li Xue Za Zhi. 51 (4), 332–337. https://doi.org/10.3760/cma.j.cn112151-20210719-00516.

Xu, Y., Li, L., 2018. Primary squamous cell carcinoma arising from endometriosis of the ovary: A case report and literature review. Curr. Probl. Cancer 42 (3), 329–336. https://doi.org/10.1016/j.currproblcancer.2018.02.001.

Yamakawa, Y., Ushijima, M., Kato, K., 2011. Primary squamous cell carcinoma associated with endometriosis: A case report and literature review. Int. J. Clin. Oncol. 16 (6), 709–713. https://doi.org/10.1007/210147-011-0189-3.

Zhang, C., Ma, T., 2020. Poorer prognosis of ovarian squamous cell carcinoma than serous carcinoma: a propensity score matching analysis based on the SEER database. J Ovarian Res. 13 (1), 75. https://doi.org/10.1186/s13048-020-00675-y.