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Case report

Primary clear cell carcinoma of the vulva: A case report

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ABSTRACT

Clear cell carcinoma (CCC) of the vulva is extremely rare. We report a case of a 54-year-old woman who presented with a 5 cm mass of the mons pubis. She underwent needle biopsy demonstrating CCC. She then underwent radical vulvectomy with bilateral inguinofemoral lymph node dissection. Surgical pathology revealed CCC of the vulva with lymphovascular space invasion (LVSI) and metastatic carcinoma in 1/7 inguinal lymph nodes. The patient has a history of endometriosis, raising suspicion that her CCC could have arisen from endometriosis in the mons. She completed adjuvant treatment with cisplatin and concurrent external beam radiation therapy with radiographic evidence of complete response. However, short-interval imaging demonstrated multi-focal recurrence, which was confirmed with supraclavicular lymph node biopsy. She then completed 8 cycles carboplatin, paclitaxel, and biosimilar bevacizumab-bvzr with favorable response on imaging. She was continued on bevacizumab maintenance. She was later started on pembroluzimab for disease progression based on new mediastinal adenopathy and worsening retroperitoneal lymphadenopathy. She received eight cycles of pembrolizumab with ongoing disease progression before enrolling in hospice and discontinuing cancer-directed treatment. As described in the related literature which we summarize here, the majority of reported cases of vulvar CCC arise from endometriosis implants at the site of prior episiotomy or from the Bartholin's gland. This patient had clinical history of endometriosis; prior tissue sampling was not performed to support the diagnosis. Given the absence of data regarding this rare type of primary vulvar cancer, treatment of this patient's disease was based on existing data specific to squamous cell carcinoma of the vulva and extrapolated from treatment guidelines for CCC of the ovary and endometrium. Continued research is needed on this rare form of vulvar carcinoma to determine the risk factors, prognostic factors, and treatment recommendations specific to this disease.

1. Introduction

Primary clear cell carcinoma (CCC) of the vulva is an extremely rare malignancy. Only fourteen cases of vulvar CCC have been reported in the literature (Sampson, 1925; Kojima et al., 2019; Buppasiri et al., 2018; Bolis and Macciò, 2000; Mesko et al., 1988; Lim et al., 2002; Chatzistamatiou et al., 2015; Herghelegiu et al., 2018; Sachdeva et al., 2021). Due to its rarity, there is no consensus on standardized therapy, nor well-defined prognostic indicators for this cancer. In the few cases reported, CCC of the vulva has been overwhelmingly associated with endometriosis at site of prior episiotomy or arising from the Bartholin's gland. Here, we discuss a unique case of primary CCC of the vulva presumably unrelated to either site, outline its treatment and rapid recurrence, and review the literature related to this rare disease.

2. Case description

A 54-year-old (gravida 1 para 1) woman with a past surgical history of a low-transverse cesarean section and laparoscopic hysterectomy for dysmenorrhea and uterine fibroids, who presented with a mons pubis mass that grew over 18 months. History was also notable for obesity (BMI 38.8) and suspected endometriosis based on symptoms and gross diagnostic laparoscopy findings per patient report, though the diagnosis was never pathologically confirmed. She had a 20-year history of recurrent vulvar cysts, treated with multiple incision and drainage procedures.

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At initial presentation to her gynecologist, the mass was 6 × 5 cm, firm, mobile, and indurated. She was treated for presumed vulvar abscess. When not responsive to antibiotic therapy, MRI of the pelvis was performed. Imaging showed a 5.7 cm multilobulated vulvar mass in the subcutaneous soft tissue of the mons pubis with internal hyperenhancement, prominent yet morphologically normal inguinal lymph nodes, and an indeterminate left common iliac lymph node (Fig. 1). Patient was then referred to Gynecological Oncology.

Core biopsy of the mass showed morphological and immunohistochemical features consistent with primary Mullerian CCC of the vulva.

Subsequent PET/CT scan demonstrated an FDG avid 6.7 cm mass of the mons pubis, an FDG avid right inguinal lymph node concerning for metastasis, and an indeterminant *retro*-aortic lymph node (Fig. 1). The patient then underwent a radical vulvectomy with bilateral inguinofemoral lymph node dissection. Operative findings included a firm mass occupying most of the mons pubis, extending to just above the clitoral hood, with skin ulceration inferiorly (Fig. 2). Grossly, it was a 6.5 cm circumscribed, tan-pink, multilobulated tumor. Histological sections showed a tumor with papillary and solid architecture, moderate to high-grade nuclear atypia, and clear to eosinophilic cytoplasm. Immunohistochemistry (IHC) showed the tumor was positive for Napsin A, HNF1 beta, AMACR, PAX8, EMA, and negative for ER, PR, p16, and GATA3. Mismatch repair (MMR) proteins were intact, and p53 showed a wild-type staining pattern. ARID1A was lost (abnormal), and PTEN was intact (normal). PD-L1 IHC showed a Combined Positive Score (CPS) of 5, mostly due to expression in mononuclear inflammatory cells, with very rare positive tumor cells. (Fig. 3). Overall, the clinicopathological and immunohistochemical features were consistent with a primary Mullerian CCC. LVSI was present, and margins were negative. Metastatic carcinoma (>5 mm) was identified in 1/7 right and 0/4 left inguinal lymph nodes. No endometriosis was identified. Surgical staging was consistent with Stage IIIA CCC of the vulva.

Next generation sequencing (FoundationOneCDx) demonstrated an ARID1A K1953fs*3 mutation (consistent with the loss of the protein by IHC), and amplifications in ARFRP1, GNAS, LYN, MYC, RAD21, ZNF217. The tumor was Microsatellite-Stable with a low Tumor Mutational Burden of 1 Mut/Mb. No actionable mutations were identified (Table 1).

The patient developed a post-operative wound infection for which she underwent debridement and wet-to-dry dressing changes, therefore her adjuvant treatment with weekly cisplatin and concurrent external beam radiation therapy did not begin until 12 weeks after initial surgery. She was planned for 45 Gy in 25 fractions to the vulva, pelvis, inferior paraaortic, and inguinal lymph nodes with subsequent lymph node boost. Her course was truncated due to toxicity to a final dose of 50.4 Gy in 28 fractions which was completed in 7 weeks.

Three-month post-treatment PET/CT demonstrated a favorable treatment response, with subtle areas of increased or new FDG avidity indeterminate for recurrence. Short-interval PET/CT performed two months later demonstrated a multi-focal recurrence, with increase in the size and FDG avidity of the previously seen retroperitoneal lymph nodes and mesenteric soft tissue nodule. Multiple new FDG avid pelvic, retroperitoneal, prevascular, and supraclavicular lymph nodes were noted suggestive of progressive metastatic disease. Left supraclavicular lymph node biopsy confirmed metastatic CCC (Fig. 4).

The patient then completed 8 cycles of carboplatin, paclitaxel, and

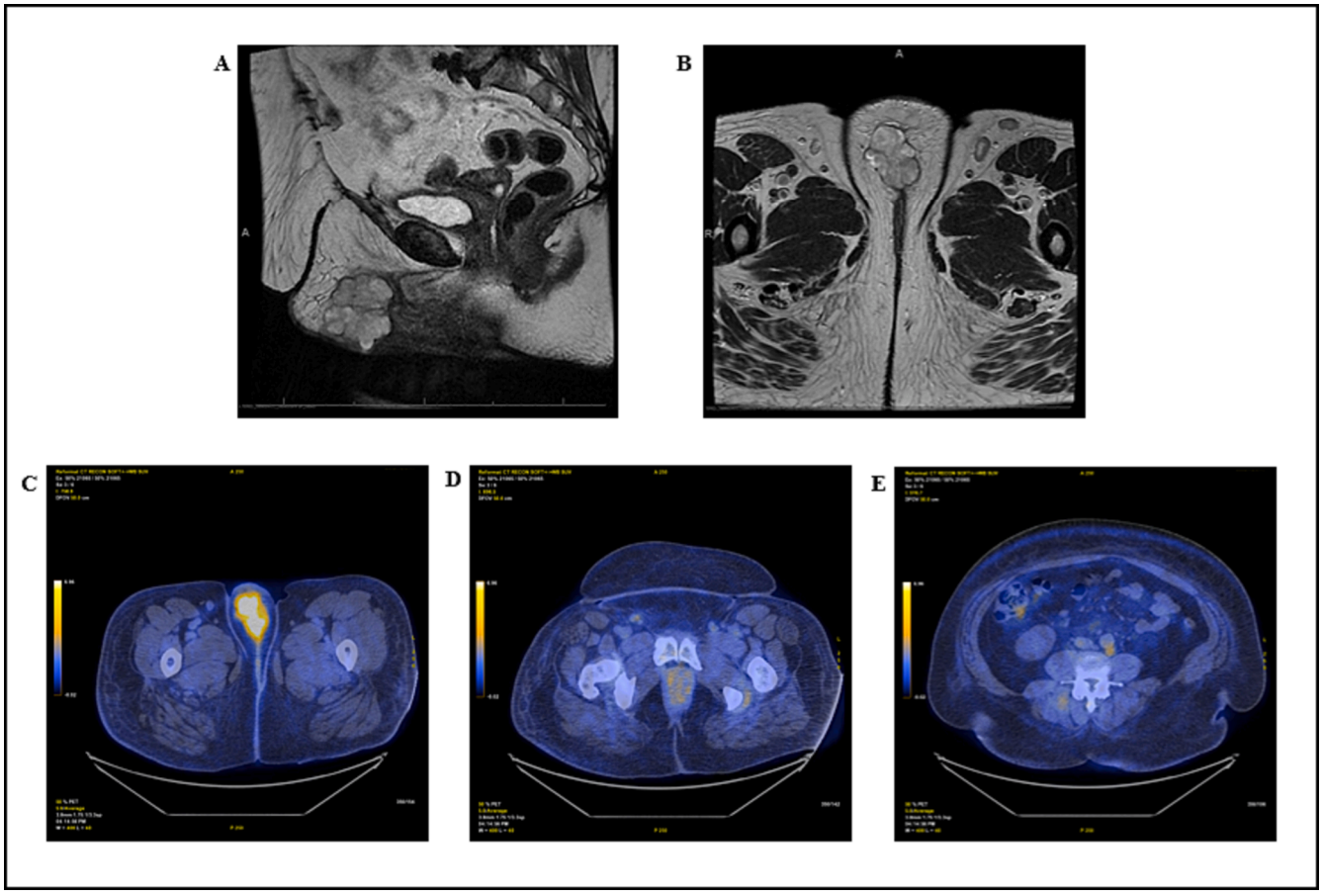

Fig. 1. MRI pelvis demonstrating a heterogenous vulvar mass centered in the subcutaneous soft tissue of the vulva, measuring 5.2 × 4.4 × 5.7 cm with intermediate high T2 signal and internal hyperenhancement with restricted diffusion (A and B). PET/CT shows a soft tissue density mass in the mons pubis, measuring 6.7 × 4.2 cm transverse by 6.5 cm craniocaudal with SUV max 10.3 g/mL (C), a right inguinal lymph node measuring 1.4 × 1.1 cm with SUV max 4.2 g/mL (D), and *retro*-aortic lymph node measuring 1.6 × 1.0 cm with SUV max 3.6 g/mL, which was slightly greater than blood pool background (E).

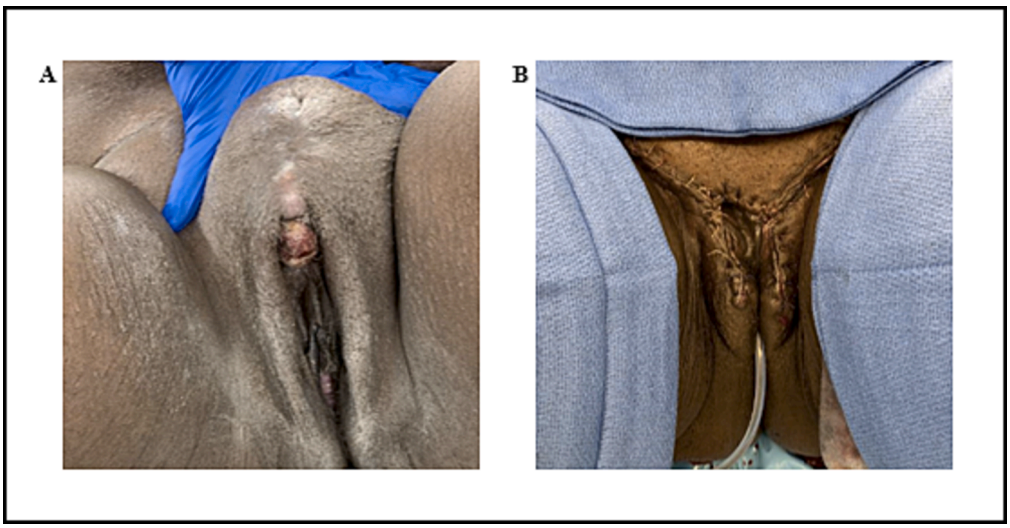

Fig. 2. Clinical appearance of the mons pubis mass with ulceration through the skin at inferior edge of tumor on day of surgery (A), and post-resection appearance of vulva (B).

bevacizumab-bvzr with a favorable response on imaging including an interval decrease in size and FDG avidity of all previously noted lymph nodes/nodules and no new sites of disease. She continued on bevacizumab-bvzr maintenance for 9 months, before discontinuing due to worsening shortness of breath and new diagnosis of congestive heart failure. She was later started on pembroluzimab for disease progression based on new mediastinal adenopathy and worsening retroperitoneal lymphadenopathy. She received eight cycles of pembrolizumab with ongoing disease progression before enrolling in hospice and discontinuing cancer-directed therapy. The patient passed on hospice 35 months after diagnosis.

3. Discussion

Unlike CCC of the ovary or endometrium, CCC of the vulva is an extremely rare disease. Only fourteen cases of vulvar CCC have previously been reported, and in most the CCC arose from endometriosis. Seven reported cases met Sampson's criteria, which is a set of three diagnostic criteria for malignancy arising in endometriosis. The criteria required are: (1) evidence of endometriosis in proximity to the tumor, (2) absence of another primary site tumor, and (3) histological evidence consistent with an endometrial origin (Sampson, 1925). In another two cases, history and clinical presentation suggest presence of endometriosis. In five cases, the CCC arose within a prior episiotomy site. These case reports theorize that the extra-gonadal endometriotic precursor lesions are caused by iatrogenic seeding of endometrial tissue to the vulva at time of episiotomy during vaginal delivery (Kojima et al., 2019; Buppasiri et al., 2018).

In the four cases of CCC arising from endometriosis but not at a prior episiotomy site (including our patient), all patients had a history of abdominal surgery for endometriosis—including two who underwent ovarian cystectomy with primary CCC in the labia majora and one who underwent an abdominal hysterectomy and right inguinal hernia repair with primary CCC tumor in the Canal of Nuck (Bolis and Macciò, 2000; Mesko et al., 1988). It was hypothesized by the authors of one of those case reports, Mesko et al, that the patient's prior surgeries might have contributed to the dissemination of endometriosis into the patient's vulva by way of the inguinal canal.

Of the six other case reports of CCC of the vulva in the literature not associated with a history of endometriosis, three are suspected to have arisen from the Bartholin's gland and two from a prior episiotomy site. The final case is that of a CCC of the right labia majora independent of endometriosis and without history of episiotomy (Lim et al., 2002; Chatzistamatiou et al., 2015; Herghelegiu et al., 2018; Sachdeva et al., 2021). The Bartholin's gland is the most common site of adenocarcinoma of the vulva, and the etiology of CCC seems to be independent of endometriosis in that location.

Our patient had a reported history of endometriosis and uterine leiomyoma, for which she underwent two laparoscopies for suspected endometriosis, and a laparoscopic hysterectomy 20 years prior to her diagnosis of CCC. She also had a history of prior low-transverse cesarean section. Similar to Mesko et al's postulation that abdominal surgery could have seeded endometriosis into the Canal of Nuck, it seems plausible that our patient's four prior abdominal surgeries could have seeded endometriosis into the mons pubis. The occurrence of endometriosis implants in surgical incisions is well-established in the literature, and cesarean scar endometriosis is the most common site of abdominal wall endometriosis (Zhang et al., 2019). While CCC arising from abdominal incisions is rare, it has also been documented in the literature—and most commonly associated with prior cesarean section (Hashemi et al., 2021). While there was no background endometriosis observed in any of the tumor specimen sent for pathologic evaluation, it is highly plausible that the tumor destroyed the endometriotic implant from which it arose. Additionally, this patient's vulvar CCC demonstrated a loss of ARID1A expression on IHC and an *ARID1A* mutation on next generation sequencing. Inactivating mutations of the ARID1A tumor suppressor gene are commonly found in endometriosis-associated CCC and endometrioid carcinomas of the ovary and endometrium, and have been implicated as a critical step in the transformation of endometriosis into ovarian cancer (Wiegand et al., 2010). This patient did not meet Sampson's criteria for diagnosing malignant transformation of endometriosis. However, her clinical history and presence of ARID1A mutation provides clues to the possible mechanism of tumorigenesis.

Literature review revealed fourteen published cases of primary CCC of the vulva since 1986, with our case being the fifteenth reported case. Median age of diagnosis was 50 (range 36 – 70). The majority of patients (53 %) presented with metastatic disease, and the most common site of metastases was the inguinal lymph nodes. Eleven of fifteen patients received surgery, and 50 % of those patients received adjuvant therapy, mostly with platinum-based agents. Six patients with metastatic disease recurred, with a median progression-free survival (PFS) of 6 months (range 3 to 12 months) and median overall survival (OS) of 32.5 months (range 17–45 months). No patients with early-stage disease recurred. Of note, length of follow-up was limited for patient with no evidence of disease (median 9 months), and survival data was not reported in several cases. [Table 1].

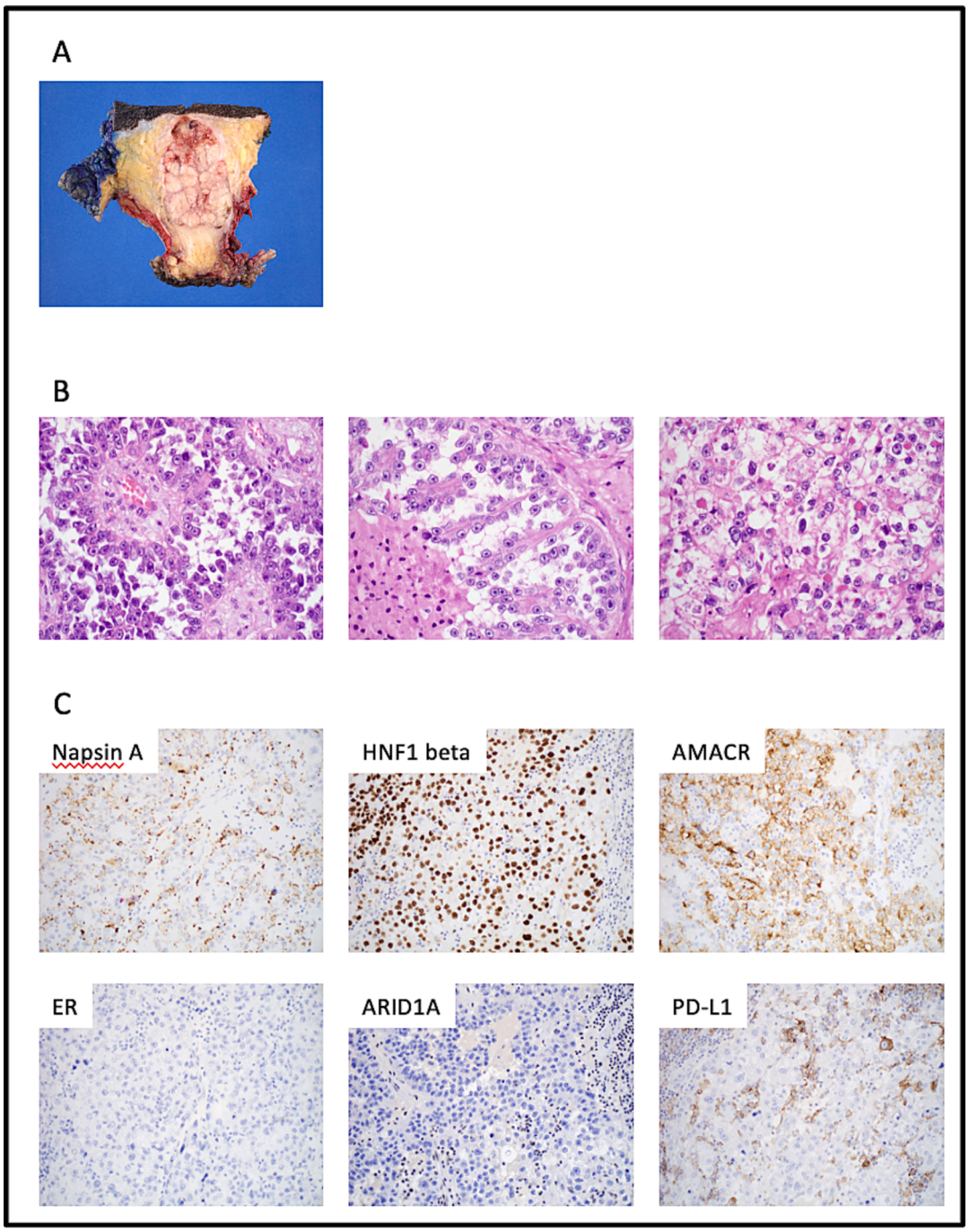

Fig. 3. Gross appearance of tumor (A). Histological sections show papillary and solid architecture, moderate to high-grade nuclear atypia, and clear to eosinophilic cytoplasm (B). Immunohistochemistry (IHC) positive for Napsin A, HNF1 beta, AMACR, and negative for ER. ARID1A was lost (abnormal). PD-L1 IHC showed a Combined Positive Score (CPS) of 5, mostly due to expression in mononuclear inflammatory cells, with very rare positive tumor cells (C).

This case is particularly unique given the patient's rapid and distant disease recurrence arising in the pelvic, retroperitoneal, and supraclavicular lymph nodes. This begs the question of whether usual prognostic indicators of outcomes in vulvar carcinoma, which are derived from studies based on squamous carcinoma of the vulva, can be extrapolated to cases of CCC of the vulva. Prognostic factors found to be statistically significant for risk of recurrence in squamous cell vulvar carcinoma include FIGO stage greater than II, positive lymph nodes, and LVSI. While in our patient's case the prognostic indicators from squamous cell vulvar carcinoma seem to be applicable in terms of her recurrence risk, more studies are needed to determine whether this correlation is reliable. This could greatly impact counseling and monitoring of patient's following treatment of primary disease.

Additionally, there are no existing data to guide treatment of CCC of the vulva in both the primary and recurrent setting. Treatment of recurrent vulvar adenocarcinoma is currently extrapolated from the data on treatment of recurrent squamous cell carcinoma of the vulva, and in this patient's, case it was also coupled with systemic therapy principles for CCC of the ovary and endometrium. Based on existing literature regarding treatment of recurrent squamous cell carcinoma, and current National Comprehensive Cancer Network guidelines, decision was made to treat this patient's distal recurrence with carboplatin, paclitaxel, and bevacizumab-bvzr (Reade and Eiriksson, 2014). Further data is clearly needed to better define optimal treatment strategies for

Table 1
Published Cases of Clear Cell Carcinoma of the Vulva.

	Author, Year, and Country	Age (years), Parity (if reported), and Relevant Hx	Primary Site and Size (cm)	Sites of Metastasis at Dx	Association with Endometriosis on Histology	Initial Treatment	Disease Course	IHC and NGS	NGS
1	Mesko et al 1986 United States (Mesko et al., 1988)	57 G2P2 R inguinal hernia repair TAH/BSO C-section x2	Canal of Nuck and R labia majora, 4 cm	R inguinal LN replaced by tumor	Yes	Vulvar/groin resection, ex-lap, RSO, and R common iliac LN sampling	- PFS: 3 months, groin recurrence Surgery and RT > NED PFS2: 24 months, pulmonary recurrence, declined Tx OS: not reported	—	—
2	Hitti et al 1990 United States (Hitti et al., 1990)	43 G1P1 R mediolateral episiotomy Resection of endometriosis from episiotomy scar	R perineum and buttock (episiotomy scar), 10 cm	Bilateral inguinal LN, extension into ischiorectal fossa	Not on histology—but clinical Hx suggestive*	Chemotherapy and RT *(PR)*	- PFS: 12 months OS/DOD: 30 months	—	—
3	Bolis et al 2000 Italy (Bolis and Macciò, 2000)	52 G1P1 - R ovarian cystectomy for endometrioma	L labia majora, 3 cm	None	Yes	Surgical resection	- NED: 5 months	—	—
4	Todd et al 2000 United Kingdom (Todd et al., 2000)	54 Episiotomy Resection of endometrioma from episiotomy scar	Perineum (episiotomy scar), 3 cm (at time of surgery)	Possible involvement of anal sphincter, with 1–2 cm extension along anterolateral anal canal	Yes	RT × 19 Fx *(PR)* > partial vaginectomy, Hartmann's procedure, and BSO	- NED: 6 months	—	—
5	Lim et al 2002 United Kingdom (Lim et al., 2002)	46 - None	L Bartholin's gland, 4–5 cm	None	No	WLE > bilateral IGLND	- NED: 9 months	—	—
6	Kwon et al 2008 Korea (Kwon et al., 2008)	42 G2P2 R mediolateral episiotomy Resection of endometriosis from episiotomy scar	Posterior fourchette/ commiss ure (episiotomy scar), 2.5 × 3 cm	None	Yes	Radical vaginectomy, vulvar WLE with partial skin graft, TAH, PLND, and R IGLND	- NED: 10 months	—	—
7	Chatzistamatiou et al 2015 Greece (Chatzistamatiou et al., 2015)	49 - None	L Bartholin's Gland, 3 cm	None	No	L hemi-vulvectomy and R IGLND	- NED: 30 months	—	—
8	Han et al 2016 China (Han et al., 2016)	36 L mediolateral episiotomy Resection of endometriosis from episiotomy scar	L perineum (episiotomy scar), 5 × 10 cm	None	Yes	WLE > 1C paclitaxel/ cisplatin > radical vulvar excision with skin graft and IGLND > 2C paclitaxel/ cisplatin	- NED: 6 months	—	—
9	Buppasiri et al 2018 Thailand (Buppasiri et al., 2018)	46 G0 Ovarian cystectomy x3 for endometriosis TAH/BSO and resection of 3.7 cm labial endometriosis with focal atypical endometriosis	R labial mass extending to R groin, 4 × 7 cm	Concern for involvement of pubic symphysis and inguinal LN	Yes	Declined radical surgery > 2 doses of GnRH agonist > DMPA *(rapid PD)*	- 2C of carboplatin/ paclitaxel *(rapid PD)* Palliative RT OS/DOD: 17 months	—	—

(*continued on next page*)

Table 1 (*continued*)

	Author, Year, and Country	Age (years), Parity (if reported), and Relevant Hx	Primary Site and Size (cm)	Sites of Metastasis at Dx	Association with Endometriosis on Histology	Initial Treatment	Disease Course	IHC and NGS	NGS
10	Kojima et al 2019 Japan (Kojima et al., 2019)	70 G2P2 L mediolateral episiotomy TAH/BSO	L labia minora/ vestibule (episiotomy scar), 1.8 cm	None	No	Radical local excision, L IGLND, and right inguinal LN Bx	- NED: 5 months	**Positive:** PAX8, HNF1-beta, ER, CA-125, ARID1a (intact) **Negative:** p16, CD10, GATA3, PTEN (loss), PAX2 **p53: wild-type**	**Ion Ampliseq Cancer Hotspot panel version 2, 50 gene panel** - No oncogenic mutations identified
11	Herghelegiu et al 2018 Romania (Herghelegiu et al., 2018)	54 - Recurrent R Bartholin's gland abscess s/p surgical drainage x2 in past year	R labia majora (replacing Bartholin's gland), 1.5 × 2 cm	Fixed bilateral inguinal LN (R 6 cm, L 3 cm), bilateral pelvic and *para*-aortic LN	No	4C platinum-based therapy *(PR)*	- Stopped chemotherapy due to grade 3 GI toxicity and poor performance status OS: not reported	**Positive:** CK7, PAX8, Napsin A, Vimentin **Negative:** ER, PR, Calretinin, CD10, CEA, p16, p63 **p53: 30–40 %** (suggests wild-type) **Ki67: 70 %**	—
12	Xu et al 2020 China (Xu et al., 2020)	54 L episiotomy Resection of endometriosis from episiotomy scar x2 Hx of breast cancer	L perineum, 5 × 6 cm	Bilateral inguinal LN (largest 3 × 3 cm)	Yes	Radical vulvectomy and bilateral IGLND > RT × 1 month	- NED: 15 months	**Positive:** CK, p16, HNF1-beta, AMACR **Negative:** PR	—
13	Sachdeva et al 2021 Singapore/ Philippines (Sachdeva et al., 2021)	40 G0 - None	R labia majora, 12 cm	Fixed bilateral inguinal LN (L 10 cm, R 4 cm)	No	WLE and bilateral IGLND with unresectable L femoral LN > 6C carboplatin/ paclitaxel > pelvic RT to vulva and inguinal region with weekly cisplatin	- PFS: 3 months, local progression 5C carboplatin/ docetaxel *(PD)* 4C gemcitabine/ ifosfamide *(PD)* 2C weekly paclitaxel *(PD)* 16C pembrolizumab PFS2: 8 months on immunotherapy Developed MDS-ES after 4C > progression to AML OS: 45 months (died of AML)	**Positive:** HNF1-B, CK, CAM 5.2 **Negative:** p16, p40, Napsin A, Desmin, SMA, S-100, Melan-A **p53: mutant** **MMR: intact** **PD-L1: CPS 45**	**FoundationOne** TMB 5 mut/mb MSS MET amplification CDKN2A/B loss TERT promoter124C > T - TP53 G154S
14	Barrena-Medel et al 2021 Chile (Barrena-Medel et al., 2021)	54 - Episiotomy	R perineum/ buttock (episiotomy scar), 7 cm	None on imaging	No	Radical excision and V-Y gluteal advancement flap	- NED: length not reported	**Positive:** PAX8, Napsin A	—
15	Current 2022 United States	54 G1P1 Low transverse c-section x1 Dx laparoscopy for suspected endometriosis x2 Laparoscopic hysterectomy for AUB, painful menses, and	Mons pubis, 7 cm	R inguinal LN	Not on histology— but clinical Hx and molecular genetics suggestive **	Radical vulvectomy and bilateral IGLND > RT and weekly cisplatin × 6 weeks	- PFS: 6 months, recurrence to RP LN and supraclavicular LN 8C carboplatin/ paclitaxel/ bevacizumab *(PR)* > stopped due to toxicity 14C	**Positive:** Napsin A, HNF1-beta, AMACR, PAX 8, EMA, AE1/ AE3, PTEN (intact) **Negative:** ER, PR, p16, GATA3, mammaglobin,	**FoundationOne** TMB 1 mut/mb MSS Amplifications: ARFRP1, GNAS, LYN, MYC, RAD21, ZNF217 ARIDIA K1953is3

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Table 1 (*continued*)

Author, Year, and Country	Age (years), Parity (if reported), and Relevant Hx	Primary Site and Size (cm)	Sites of Metastasis at Dx	Association with Endometriosis on Histology	Initial Treatment	Disease Course	IHC and NGS	NGS
	leiomyoma Recurrent cysts/abscesses of the vagina, vulva, and perineum with I&D x6					bevacizumab *(PD)* 8C pembrolizumab *(PD)* OS/DOD: 35 months	ARID1A (loss) **p53: wild-type** **MMR: intact** **PD-L1: CPS 5**	

*Vulvar mass fluctuated in size with menses and Hx of histology proven endometriosis implant excised from same location.
**Vulvar mass suspected to have originated from endometriosis implant based on Hx and ARID1A mutation on tumor sequencing.
Abbreviations: AML = acute myeloid leukemia, AUB = abnormal uterine bleeding, AWD = alive with disease, BSO/RSO/LSO = bilateral/right/left salpingo-oophorectomy, Bx = biopsy, C = cycle, DMPA = depo medroxyprogesterone acetate, DOD = died of disease, DOI = depth of invasion, Dx = diagnosis/diagnostic, GnRH = gonadotropin releasing hormone, IGLND: Inguinal lymph node dissection, L = left, LN = lymph nodes, MDS-ES = myelodysplastic syndrome with excess blasts, NED = no evidence of disease, OS = overall survival, PD = progressive disease, PFS = progression free survival, PFS2 = second progression free survival, PLND = pelvic lymph node dissection, PR = partial response, R = right, RP = retroperitoneal, RT = radiation therapy, TAH = total abdominal hysterectomy, Tx = treatment, VD = vaginal delivery.

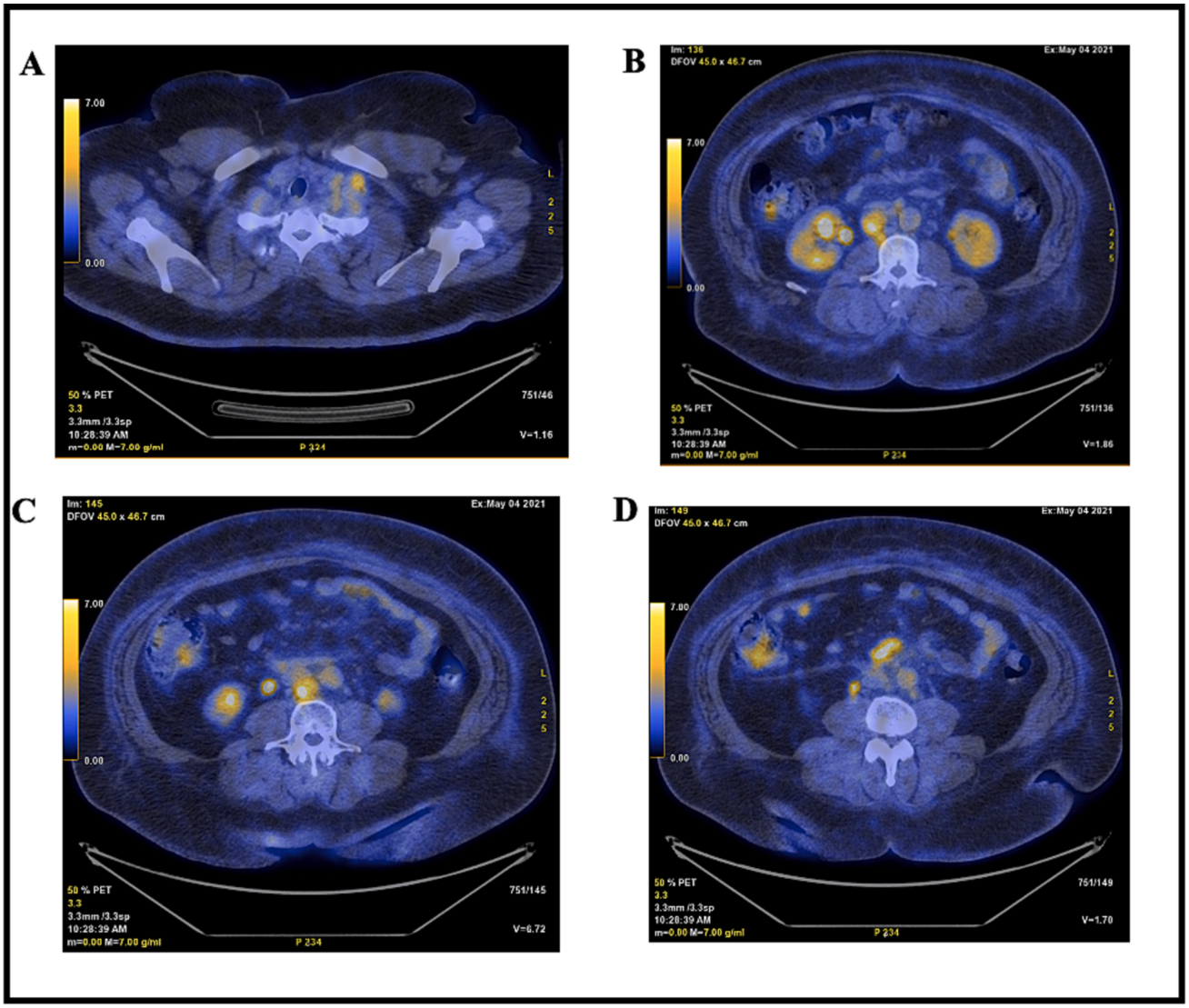

Fig. 4. Short-interval post-treatment PET/CT showed multifocal recurrence pattern, a sample of which are included here. (A) Enlarged left supraclavicular lymph node measuring 1.9 × 1.2 cm with SUV max of 5.2 (B) Right retrocaval lymph node measuring 1.9 × 2.3 cm with SUV max of 8.4, previously 1.2 × 1.3 cm with SUV max of 3.7 (C) New aortocaval node measuring 2.2 × 1.5 cm with SUV max of 8.6. (D) Mesenteric soft tissue nodule measuring 3.5 × 1.6 cm with SUV max of 8.2, previously 1.5 × 1.2 cm with SUV max of 5.9. There is surrounding misty mesentery.

this rare disease.

4. Conclusions

In summary, we have described a rare case of primary vulvar CCC not occurring at prior episiotomy site or arising from the Bartholin's gland, and report the first case of a documented *ARID1A* mutation of CCC of the vulva—further supporting the mechanism of this rare tumor as arising from extra-pelvic endometriosis. We also review the largest case series to date, and the only case series including IHC and NGS for multiple patients. Given the absence of data regarding this rare type of vulvar cancer, treatment of this patient's primary and recurrent disease was based on existing data for squamous cell carcinoma of the vulva and extrapolated from treatment guidelines for CCC of the ovary and endometrium. Continued research is needed on this rare form of vulvar carcinoma to determine the risk factors, prognostic factors, and treatment recommendations specific to this disease.

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Consent statement: The manuscript is carefully reviewed to avoid patient identification details and/or figures. Non-human subjects research designation was granted by our institution's IRB for the purpose of this publication. Written consent has been obtained from the patient and is held on file at our institution.

CRediT authorship contribution statement

Tali Pomerantz: Project administration, Writing – original draft. **Nicole J. Rubin:** Project administration, Writing – review & editing. **Anthony N. Karnezis:** Resources, Writing – review & editing, Conceptualization. **Xiao Zhao:** Writing – review & editing. **Rebecca Brooks:** Supervision, Visualization, Conceptualization, Writing – review & editing.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Dr. Brooks is part of the Speakers Bureau for AstraZeneca. She has served on the Advisory Board for GSK and Eisai. None of her work for these organizations has related to or should compete with the subject matter of this study. She is a member of the Editorial Board for Gynecologic Oncology Reports.

The remaining authors have no financial interests or personal relationships to report.

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