The cystic synovial lined spaces observed in this mass have the appearances of a bursa. Two different types of bursae have been described: synovial bursa and adventitious bursa.¹⁰ Synovial bursae or true bursae are present at birth, found throughout the body near bony prominences and between bones, muscles, tendons, and ligaments, acting to decrease friction between moving structures. In contrast, adventitious bursae develop after birth in response to friction and pressure in superficial fibrous connective tissues. Since no true bursa or adjacent synovial lined joint is present at the anatomical site of this mass, we conclude that it corresponds to an adventitious bursa.

The partial synovial lining observed within the cysts is likely a metaplastic response of the injured soft tissue. Synovial metaplasia has been observed following mechanical damage to the connective tissue in situations such as experimental injections of air or oily fluids into the subcutaneous tissue, after surgical procedures,¹¹ or in patients with breast implants.

The fluctuation in size observed could be explained by fluid resorption by the synoviocytes during periods of inactivity. In addition, it is possible that mesenchymal cells in the stroma surrounding the cysts were subjected to adaptive fibrocartilaginous metaplasia, known to occur in the setting of chronic trauma.¹² This would result in cells with a chondrocytic phenotype, showing increased proteoglycan content and consequently increased water content. By this mechanism, variations in proteoglycan production and water retention according to the level of activity could contribute to variations in the size of the mass.

In typical cases, aspects of the history, anatomical location and clinical examination may allow a clinical diagnosis of surfer's bursa to be made, without the need for radiological evaluation or biopsy. If any atypical features are identified, magnetic resonance imaging (MRI) assessment can be an invaluable tool in the work up of these lesions, as it can help narrow the differential diagnosis, exclude malignancy and avoid unnecessary invasive procedures.⁵ If a decision for clinical follow-up rather than excision is made, the patient should be closely monitored to confirm regression of the lesion after periods away from surfing and to detect any atypical clinical changes. If clinically required, MRI could also be used in the follow-up, as imaging changes could alert the clinician to the need for surgical excision to exclude neoplastic or inflammatory pathology.

Prevention and mitigation strategies are effective in this condition. Lessening the intensity of surfing led to a reduction in the size of the mass. The use of padding, including wetsuits and a padded vest, offered protection and avoided further recurrence.

Surfer's bursa is a fluctuating, broad-based soft tissue mass occurring on the costal margin of long term surfers, believed to represent a response to repetitive, low grade trauma caused by the compression of soft tissues by the surfboard. This causes fat necrosis, fibrosis and the development of a synovial lining that can accumulate synovial fluid.

The condition is likely under-reported. In typical cases, clinical history, anatomical location, fluctuating size proportionate to the intensity of surfing and the findings on physical examination will establish a clinical diagnosis and avoid unnecessary investigations. In atypical cases, MRI is an invaluable tool in the diagnosis and/or follow-up of these lesions. Reducing the time surfing and the use of padding

may be preventive. If excised, local recurrence after resumption of surfing is possible.

Conflicts of interest and sources of funding: The authors state that there are no conflicts of interest to disclose.

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DOI: <https://doi.org/10.1016/j.pathol.2020.08.029>

Persistent vaginal melanoma as an unusual mimic in the endocervix

Sir,

Primary malignant melanomas of the vagina are rare lesions with an incidence of less than 0.1 per 100,000 per year.¹ We describe an unusual case of an adult female with a primary vaginal melanoma that re-presented on multiple occasions with local and systemic metastases and demonstrated the curious phenomenon of endocervical gland colonisation by melanoma cells, a unique feature which may mimic malignancy, effects of radiotherapy, or even Arias-Stella reaction.

A 61-year-old Chinese female presented with a 3 cm polyp located in the left lower vaginal wall, histologically confirmed to be a malignant melanoma (Fig. 1A). Molecular studies detected a c-kit exon 11 L576P mutation. The patient underwent a partial vaginectomy, and melanoma *in situ* focally involved the surgical margins. One month later, a positron emission tomography (PET) scan revealed a hypermetabolic focus within the left lower vagina, which was suspicious for residual melanoma. A repeat wide excision achieved clear surgical margins and the patient was expectantly managed.

Fifteen months later, the patient presented with upper gastrointestinal bleeding, and emergent oesophago-gastroduodenoscopy discovered an ulcerative tumour in the incisura of the stomach which was histologically confirmed to be metastatic melanoma. Synchronously, pigmented lesions developed on the right vulva and the left vaginal wall. Open subtotal gastrectomy and biopsies of the vulvar and vaginal lesions were conducted. Pathological examination revealed a 7×6×3 cm ulcerative malignant melanoma in the anterior stomach wall that infiltrated into the muscularis propria and metastasised to one perigastric lymph node. Biopsies of the left vaginal wall and right vulvar lesions showed atypical melanocytic proliferation, suspicious for melanoma *in situ*. Post-surgery, the patient was started on imatinib (tyrosine kinase inhibitor) therapy. However, she developed recurrent melanoma, which manifested as pigmented lesions on the anterior vaginal wall and a friable vaginal mass close to the introitus. At this time, the patient opted to continue imatinib therapy.

Ten months later, a PET scan showed new hypermetabolic areas within the vagina wall, suspicious for metastatic deposits. Radiotherapy to the vagina followed by palliative total hysterectomy, bilateral salpingo-oophorectomy, and partial vaginectomy were performed. Gross examination of the resection specimen showed five pigmented nodules on the right lateral and anterior aspects of the vaginal wall, ranging in size from 0.7 cm to 1.4 cm. Smaller pigmented nodules

were also present within the anterior and posterior lips of the cervix, measuring 0.2 and 0.3 cm, respectively (Fig. 1B). On histological examination, multiple nodular metastases were present within the vaginal wall stroma, focally associated with vascular emboli. One of the discrete stromal nodules was covered by mucosa which displayed a lentiginous and nested proliferation of atypical melanocytes which extended well beyond the confines of the stromal tumour (Fig. 2A,B). No connection between the stromal deposit and overlying junctional melanocytes was demonstrable. Within the vulva, lentiginous proliferation of atypical melanocytes was associated with pagetoid extension and separate areas of sub-mucosal melanosis. In the cervix, submucosal metastatic deposits of melanoma, and minor focal mucosal tumour nests were seen. The unique feature seen in the cervix was colonisation of intact endocervical glands by highly pleomorphic melanoma cells, most of which were devoid of any pigmentation. Some of the enlarged nuclei were hyperchromatic, whilst others were vesicular and contained prominent nucleoli (Fig. 2C,D). The uterus, ovaries, and fallopian tubes were unremarkable.

Six months later, inexorable disease with a large vaginal vault recurrence resulted in bowel and renal obstructive complications, and eventual death.

Primary vulvovaginal melanoma is exceedingly rare with an incidence of less than 0.1 per 100,000 per year,¹ is thought to arise from melanocytes present in the basal vaginal epithelium,² and more frequently occurs in Caucasian women in their fifth to seventh decades.³ The usual clinical presentation is post-menopausal bleeding, abnormal bleeding, pruritus, or a mass lesion. Superficial spreading melanoma is the most common subtype, followed by nodular melanoma and lentiginous melanoma.⁴ It has been suggested that vulvovaginal melanomas tend to be thicker and more frequently ulcerated.⁴ Vulvovaginal melanoma have low survival rates and overall poor prognosis.^{5,6}

Because vulvovaginal malignant melanoma is such a rare entity, it is often not included in the histological differential

Fig. 1 (A) The original vaginal polyp showed confluent stromal epithelial cells with pleomorphic nuclei and prominent intracytoplasmic melanin pigment (H&E). (B) Portion of the total hysterectomy, bilateral salpingo-oophorectomy and partial vaginectomy specimen showing multiple flat, brown pigmented lesions (black arrows) on the right lateral and anterior aspects of the vaginal wall, as well as anterior and posterior cervix.

Fig. 2 (A) A discrete metastatic stromal nodule of melanoma within the wall of the vagina (H&E). (B) The vaginal epithelium overlying the metastatic stromal melanoma nodule shows a lentiginous and nested proliferation of atypical melanocytes. This extended well beyond the stromal metastatic nodule (not pictured). (C) Melanoma in the cervix with endocervical glands (on the left) lined by epithelioid cells with enlarged, hyperchromatic nuclei and prominent nucleoli. An uninvolved endocervical gland is seen on the right for comparison (H&E). (D) The endocervical gland epithelium is replaced by melanoma cells with enlarged, atypical, hyperchromatic nuclei and intracytoplasmic melanin pigment (H&E).

diagnosis of a vaginal malignancy. However, recognition of some of its salient features will facilitate accurate and timely diagnosis. They appear as nodules or sheets of epithelioid cells with large nuclei, a prominent nucleolus, and have brisk mitotic activity. Less commonly, the melanoma cells show a spindle cell or mixed morphology.⁵ Recognition of cytoplasmic melanin pigment is an obviously useful feature, yet one should bear in mind that some malignant melanomas are amelanotic and present a diagnostic challenge. In one case series of 26 vaginal malignant melanomas, the diagnostic considerations included leiomyosarcoma, squamous cell carcinoma, poorly differentiated adenocarcinoma, and small cell carcinoma.⁵ In such cases where the morphological features engender a broader differential diagnosis, a combination of immunohistochemical markers for melanoma, including S100, Melan-A, tyrosinase, HMB45, and MITF would be helpful to arrive at the correct diagnosis.

Recent molecular studies indicate that vulvovaginal melanomas are distinct from melanomas of non-gynaecological origin. As a group, vulvovaginal melanomas most commonly exhibit *BRAF* and *CKIT* mutations, while *NRAS* mutations are rare.⁷ Among the *BRAF* mutated tumours, fewer vulvovaginal melanomas compared with non-gynaecological melanomas had a variant mutation within the V600 domain. *CKIT* mutations show a higher prevalence in vulvovaginal melanomas than their non-gynaecological counterparts, with the most common variant being the L576P variant in exon 11, which was present in our case.⁷ Aberrations in the MAPK/ERK and PI3K/AKT signalling transduction pathways are thought to represent early events in melanocyte transformation. In these pathways, mutations of

upstream protein kinase *BRAF* and tyrosine kinase *CKIT* leads to dysregulation of downstream effectors that regulate cellular proliferation and apoptosis, inciting malignant transformation of melanocytes.⁸

The presence of *BRAF* or *CKIT* mutations allows for targeted therapy in melanomas. While the *BRAF* V600E mutation can be targeted by the drug vemurafenib, half of vulvovaginal melanomas show variant *BRAF* mutations that are less likely to respond vemurafenib.⁷ One study estimates that only one in eight patients with vulvovaginal melanoma benefits from vemurafenib,⁷ further underscoring the low survival and poor prognosis for this distinct group of melanomas. *CKIT* mutated melanomas can be targeted by tyrosine kinase inhibitors imatinib, sunitinib, and sorafenib. The most common variant L576P is sensitive to tyrosine kinase inhibitor therapy, while less common variants such as A736V and L576R have unknown sensitivities.⁷ Experience with biotherapy for vaginal melanomas harbouring *CKIT* mutations is anecdotal, with few case reports detailing varied responses to imatinib.^{9–11} In our case, the patient died approximately 2 years after starting imatinib therapy.

The most unusual finding in our case was the presence of metastatic melanoma within the cervix, where highly pleomorphic tumour cells colonised the endocervical glandular epithelium. Conceivably, differential diagnoses for this phenomenon would include endocervical adenocarcinoma *in situ*, especially in the absence of a known history of melanoma, or if the cells are amelanotic. The single layer of highly pleomorphic cells with abundant cytoplasm would, however, more likely suggest clear cell carcinoma, rather than the conventional variety of cervical adenocarcinoma. Mitoses

would normally be present, although were not seen in our melanoma case. A single layer of large cells with abundant cytoplasm and preserved nuclear/cytoplasmic ratio may also be seen in instances of endocervical gland radiation induced atypia. The nuclei in this situation may appear 'smudged', accompanying stromal and vascular changes would be expected to be present, and no mitoses seen. Endocervical Arias-Stella change may also enter the differential diagnosis, as a single layer of enlarged, occasionally 'hob-nail' cells with abundant cytoplasm, and nuclei which may contain pseudoinclusions.

The pattern of tumour recurrence in this unique case also raises awareness of the phenomenon of epidermotropic metastasis in melanoma, and the difficulty in separating this entity from a separate primary malignancy, a well documented occurrence in melanoma with differing management implications.

In summary, this is an unusual vaginal melanoma which colonised endocervical glands, potentially mimicking endocervical adenocarcinoma *in situ* on histological grounds, on a background of recurrent, multifocal, metastatic and primary disease.

Conflicts of interest and sources of funding: The authors state that there are no conflicts of interest to disclose.

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DOI: <https://doi.org/10.1016/j.pathol.2020.08.023>

Atypical lymphoid hyperplasia of cervix with clonal *IGH/IGK* and *BCL6* gene rearrangements

Sir,

Florid reactive lymphoid hyperplasia or lymphoma-like lesion (LLL) of the uterine cervix is characterised by a superficial, polymorphous lymphoid infiltrate with intermixed large B-cells, resembling diffuse large B-cell lymphoma (DLBCL). It is important to distinguish between LLL, a benign and reactive process, and DLBCL to avoid unnecessary chemotherapy. Here, we report a clinically indolent case of an atypical lymphoid proliferation of the cervix with clonal *IGH/IGK* gene rearrangements by polymerase chain reaction (PCR) and *BCL6* gene rearrangement by fluorescence *in situ* hybridisation (FISH). The atypical lymphoid proliferation was absent in the subsequent cone biopsy by loop electrosurgical excision procedure (LEEP) and the patient remains asymptomatic without any treatment.

A 21-year-old healthy female (gravida 0) presented to her gynaecologist for an annual exam. The Pap smear detected a low grade squamous epithelial lesion with human papilloma virus (HPV) effect. The subsequent colposcopy directed biopsies showed a superficial, non-infiltrative, polymorphous lymphoid proliferation under the epithelium (Fig. 1A). The lymphoid proliferation was composed of large centroblasts, small lymphocytes and plasma cells (Fig. 1B). Necrosis was absent. The large cells were B cells positive for CD20, PAX5, BCL6 and partial CD10 (Fig. 1C–E), and negative for CD5, cyclin D1, CD43 and BCL2. CD23 showed the absence of a follicular dendritic cell meshwork. Ki-67 showed a high proliferation index of 90% (Fig. 1F). Plasma cells were polytypic by kappa and lambda light chain *in situ* hybridization (ISH). EBER ISH was negative. Molecular studies identified clonal *IGH* (frameworks I, II and III) (Fig. 2) and *IGK* (V-J) gene rearrangements by PCR. Rearrangement of the *BCL6* (3q27) locus was detected by FISH analysis in 69.5% of analysed cells. Positron emission tomography–computed tomography (PET-CT) imaging performed after the biopsy detected cervical thickening with a standardised uptake value (SUV) max of 8.8, no mass and no lymphadenopathy. Fifty-one days after her initial biopsy, a cone biopsy by LEEP showed no significant lymphoid infiltrate.

The case was initially diagnosed as DLBCL. However, given the absence of symptoms, the non-infiltrative nature of the lymphoid infiltrate, and subsequent negative LEEP biopsy, the diagnosis of DLBCL was withdrawn and the patient underwent surveillance every 4 months without chemotherapy. The patient remained asymptomatic with negative cervicovaginal Pap tests at 6 and 10 month follow-ups.

Distinguishing between LLL of the uterine cervix and lymphoma can be difficult as the histological features and molecular findings often overlap. Ramalingam and colleagues summarised 43 cases of LLL reported in the literature and a diagnosis of lymphoma was either made or considered in 25 (58%) cases.¹ LLLs are examples of exuberant lymphoid hyperplasia and have been found in association with infections, including *Chlamydia* spp.,