Unusual Finding in a Suspected Haematoma of Breast

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Clinical Information

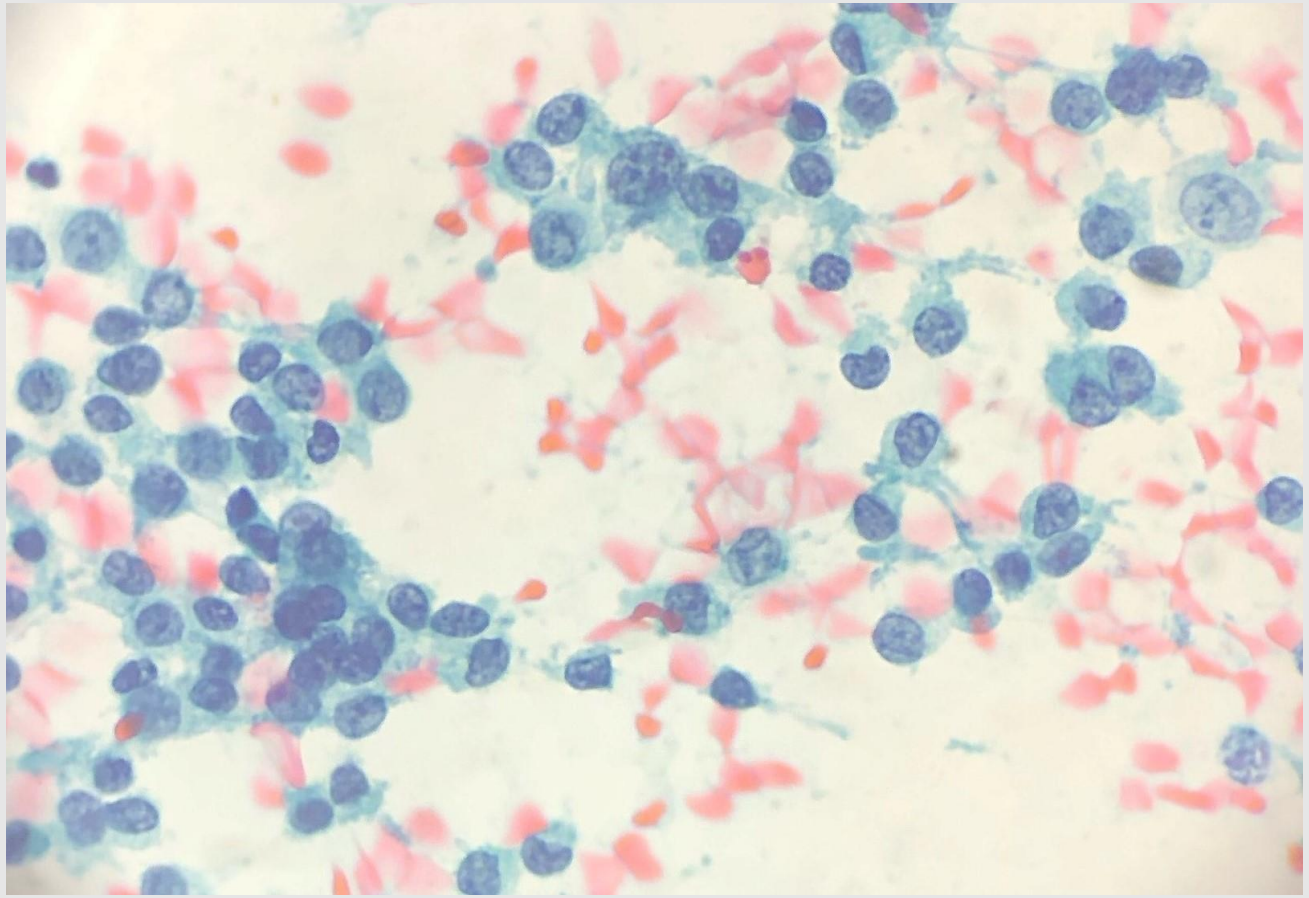
- 53-year-old Female
- No history of malignancy
- Clinically haematoma left breast
- 0.25 ml of blood-stained fluid sent to cytology

Cytology

- Given the low sample volume two direct smears were prepared
- These were stained with Papanicolaou and with May Grunwald Giemsa stains
- Enough material was left over to prepare a clot

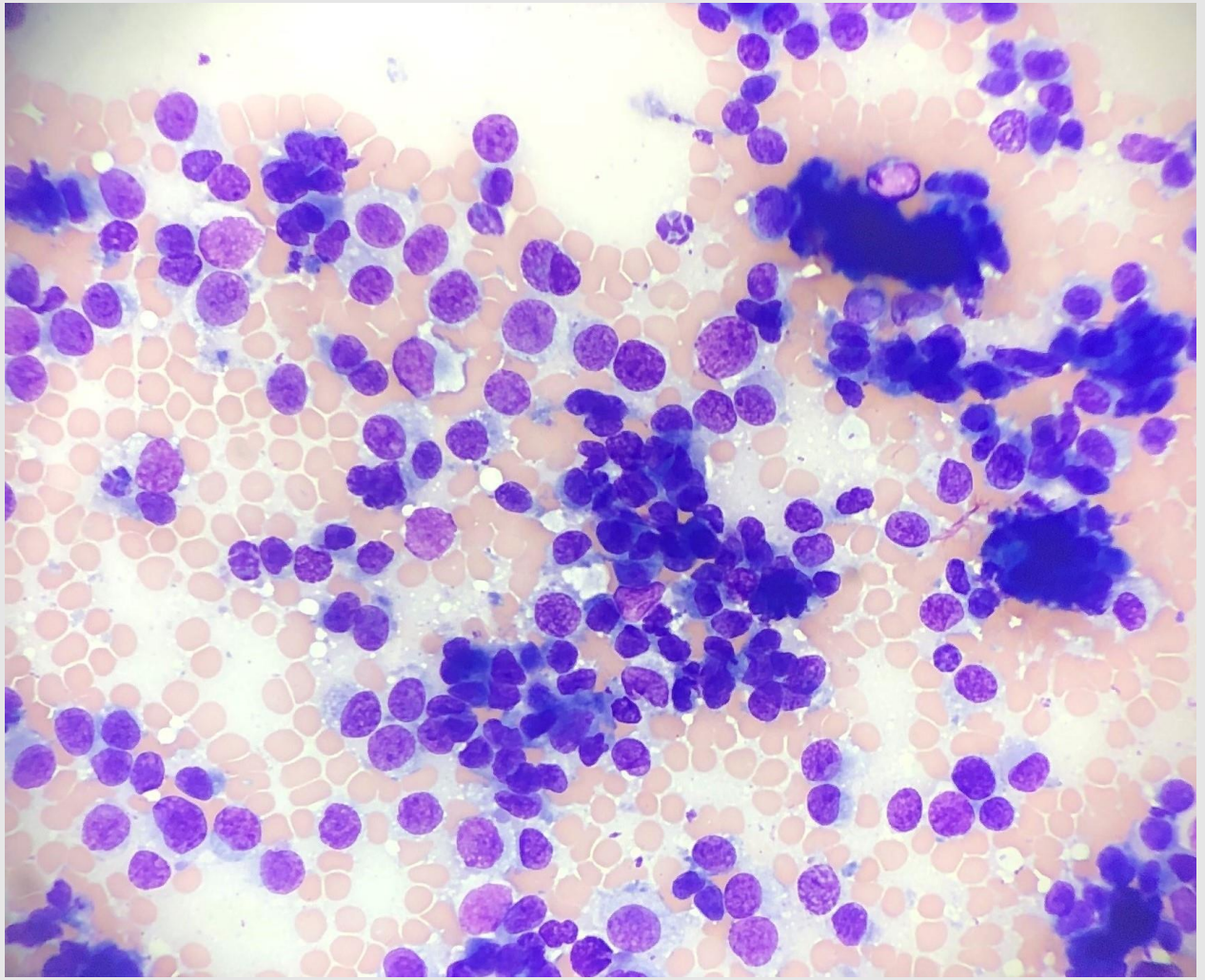
Papanicolaou x 40

The specimen contains small cells with irregularly shaped, pleomorphic and hyperchromatic nuclei. With visible nucleoli and variable amounts of cytoplasm.



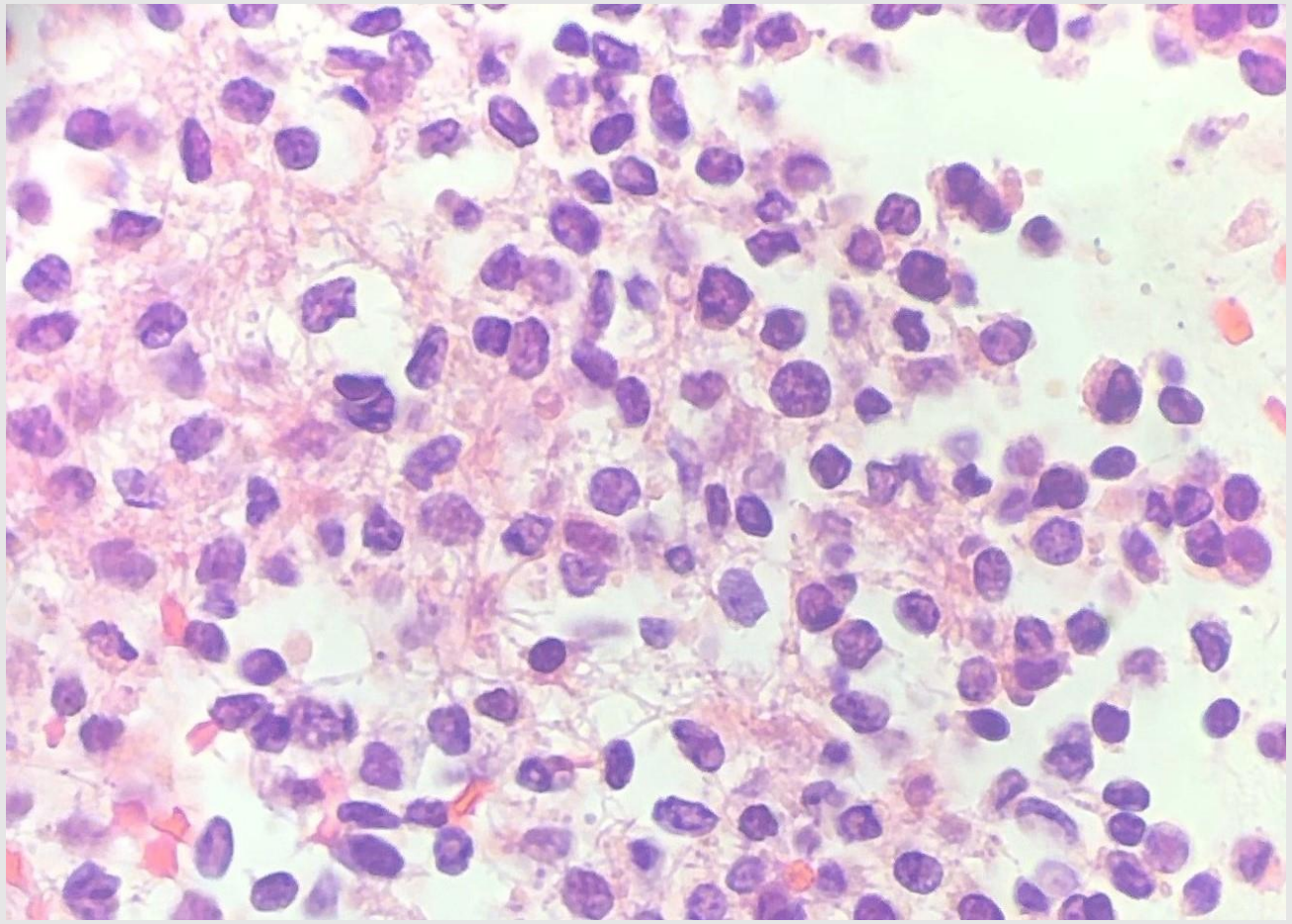
May Grunwald Giemsa x 40

MGG shows similar features to the Papanicolaou slide, with small cells with a high nuclear-cytoplasmic ratio



Thrombin clot Haematoxylin and Eosin x 40

The clot is also highly cellular, containing numerous cells with features similar to those seen in the other cytology samples.



Cytological Description

- The specimen is blood-stained fluid containing a high yield of discohesive cells with minimal to moderate amounts of cytoplasm. Occasional cells have a plasmacytoid morphology, but no cytoplasmic vacuoles are seen. The cells show some mild nuclear but no appreciable mitotic activity.

Cytology - Immunohistochemistry

- Immunohistochemistry was performed on the clot preparation.
- The following results were obtained.

Antibody	Result
Pancytokeratin	Negative
Oestrogen Receptor	Negative
LCA	Occasional positive staining
CD68	Occasional positive staining
E-cadherin	Discontinuous staining of uncertain significance

Cytology - Conclusion

- It was concluded that the high cellularity of the sample was unusual in the context of a haematoma.
- Despite the largely negative staining with LCA the appearances raised the suspicion of lymphoma.
- A core biopsy was recommended for histological assessment and definitive diagnosis.
- The specimen was reported as suspicious of malignancy.

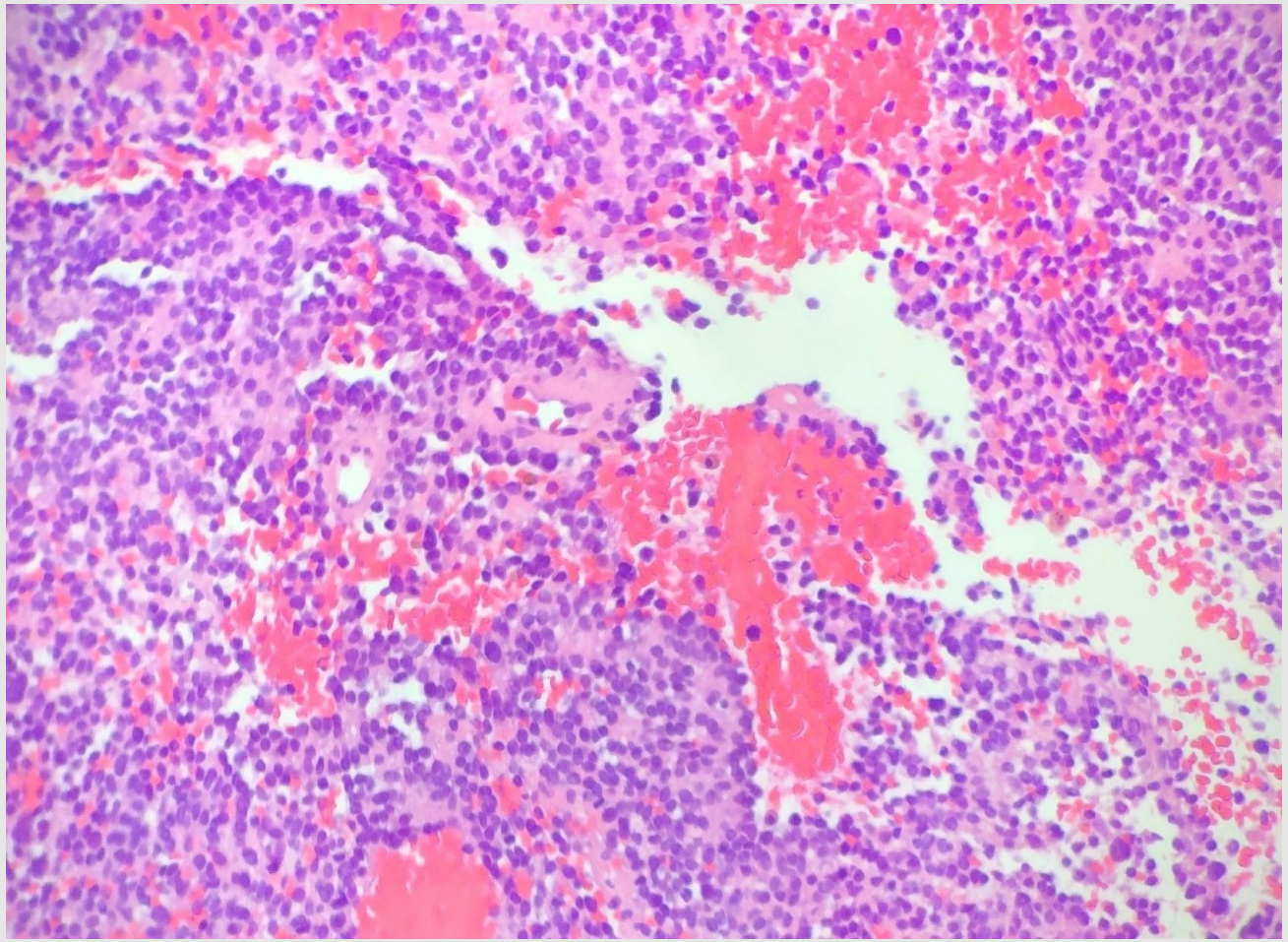
Histology

- A core biopsy was performed on the left breast.
- This yielded three cores of tissue 8, 5 and 10mm in length respectively.

Core Biopsy Haematoxylin and Eosin x40

The core biopsy contained cells similar in appearance to those seen in the Cytology specimen.

Cells have hyperchromatic nuclei with coarse chromatin



Histological Description

The specimen contains sheets of monomorphic cells, with hyperchromatic nuclei and coarse chromatin. The cells have scanty cytoplasm and indistinct cell membranes. In places the cells have a perivascular arrangement. Focally there is a vague suggestion of rosette formation. Breast glandular tissue is not seen.

Histology - Immunohistochemistry

An initial panel of four antibodies were stained

Antibody	Result
Pancytokeratin	Negative
S100	Negative
Melan A	Focal dot positivity
LCA	Some cells show weak membrane staining

Histology - Immunohistochemistry

Further immunohistochemistry was performed on the specimen.

Antibody	Result
Chromogranin	Negative
Synaptophysin	Negative
CD56	Negative
SOX10	Negative
HMB45	Negative
TTF1	Negative

Histology - Conclusion

The appearances are those of a small round cell tumour. The immunohistochemistry results are non-contributary. Given the negative markers for carcinoma and melanoma, the features are suspicious of lymphoma.

The specimen was sent to the Haematopathology team at the Royal Victoria Infirmary Newcastle for expert opinion.

A supplementary report was issued from the Northern Genetics Service Cytogenetics Laboratory

Supplementary Report

The RVI Newcastle described the cells as having the appearance of a malignant round cell tumour. Additional immunohistochemistry showed the cells to have strong diffuse membrane staining with CD99 and a weak blush with ERG. The cells were described as strongly suggestive of Ewing sarcoma.

Tissue was sent to the Northern Genetics Service Cytogenetics Laboratory. Interphase FISH showed an EWSR1 rearranged signal pattern in 79 of 100 nuclei examined, consistent with a clone with an EWSR1 (22q12) gene fusion.

This confirmed that the specimen represents Ewing sarcoma of the breast.

Discussion

Ewing sarcoma is one of the heterogenous group of small round cell neoplasms, that are characterised with similar cytomorphological features, being composed of small, round, relatively undifferentiated cells.

The Ewing sarcoma family of tumours includes classic Ewing sarcoma of bone, extra-skeletal Ewing sarcoma, malignant small cell tumour of the chest wall (Askin tumour) and soft-tissue based Peripheral Primitive Neuroendocrine tumours (pPNET)[1].

Ewing sarcoma is usually a disease of adolescents and young adults. It usually arises in bone but may present as an extra-skeletal tumour.

Discussion

While it is less common to find a case of Ewing sarcoma in an older patient it is not unheard of, even in breast tissue[2]. Nevertheless, Ewing sarcoma of breast is very rare with fewer than 20 cases reported in the literature and with ages ranging from 14-61 years [1,2]

Smears are usually hypercellular with dual populations of large and small cells. Rosette formations may also be observed[3].

Ewing sarcoma is usually negative for epithelial and lymphoid markers. It is almost always positive with CD99. However, a definitive diagnosis should only be made by identifying EWSR1 (22q12) gene fusion using FISH.

In this case the specimen was positive for both CD99 and EWSR1 (22q12) gene fusion. The patient was treated by surgical removal and chemotherapy and had no recurrence of disease 2 years after the initial diagnosis.

References

1. Papi S, Combi F, Segattini S *et al.* Ewing's Sarcoma of the Breast in a Young Woman: A Case Report and Review of the Literature. *Frontiers in Oncol*. 2022: 12.
2. *Thakur R, Venugopal R, Shama J et al.* Ewing's sarcoma presenting as Breast Mass: A Rare Occurrence and Review of Literature. *Ann Clin Case Reports. 2022. 7.*
3. *Klijanienko J, Couturier J, Bourdeaut F et al. Fine-Needle aspiration as a Diagnostic Technique in 50 Cases of Primary Ewing Sarcoma/Peripheral Neuroectodermal Tumour. Institut Curie's Experience. Diag Cytopathol. 2010: 40 (1). 19-25.*