

## Case Report

Shishou Wu<sup>#</sup>, Weifang Ding<sup>#</sup>, Xiaolong Sui, Lei Jiang, Aiyong Zhou<sup>\*</sup>, Guohua Yu<sup>\*</sup>

# Signet ring B cell lymphoma: A potential diagnostic pitfall

<https://doi.org/10.1515/med-2019-0033>

received August 3, 2018; accepted March 10, 2019

**Abstract:** Signet ring B cell lymphoma is an unusual non-Hodgkin lymphoma. It is similar to signet ring cell carcinoma and liposarcoma in morphology which should be distinguished. We treated a 63-year-old male patient who suffered from abdominal pain for two months. Multiple enlarged lymph nodes were found in the retroperitoneum by CT scan. The needle biopsy showed neoplastic cells distributed uniformly with clear cytoplasm and the nucleus squeezed to the side mimicking the appearance of signet ring in morphology. By special staining, the neoplastic cells were positive for CD45, Vimentin, Bcl-2 and CD20 but negative for AE1/AE3, S-100, CD3, EMA, CD5, CD10, Bcl-6, MUM1, Kappa, Lambda and PAS. Ki67 proliferation index was much more than 80%. Based on the histological characters, a diagnosis of signet ring B cell lymphoma was made. Although the patient received six courses of R-CHOP therapy, he died of tumor recurrence at the 34th month after diagnosis.

**Keywords:** Lymphoma; Signet ring cell; Differential diagnosis

**\*Corresponding author: Aiyong Zhou**, Department of Medicine, Affiliated Yantai Yuhuangding Hospital, Qingdao University, Yantai, China, E-mail: zay73266@163.com

**Guohua Yu**, Department of Pathology, Affiliated Yantai Yuhuangding Hospital, Qingdao University, Yantai, China E-mail: ygh0535@hotmail.com

**Shishou Wu**, Department of Clinical Medicine, Binzhou Medical College, No.346, Guanhai Road, Yantai, China

**Shishou Wu, Xiaolong Sui, Lei Jiang**, Department of Pathology, Affiliated Yantai Yuhuangding Hospital, Qingdao University, Yantai, China

**Weifang Ding**, Department of Medicine, Affiliated Yantai Yuhuangding Hospital, Qingdao University, Yantai, China

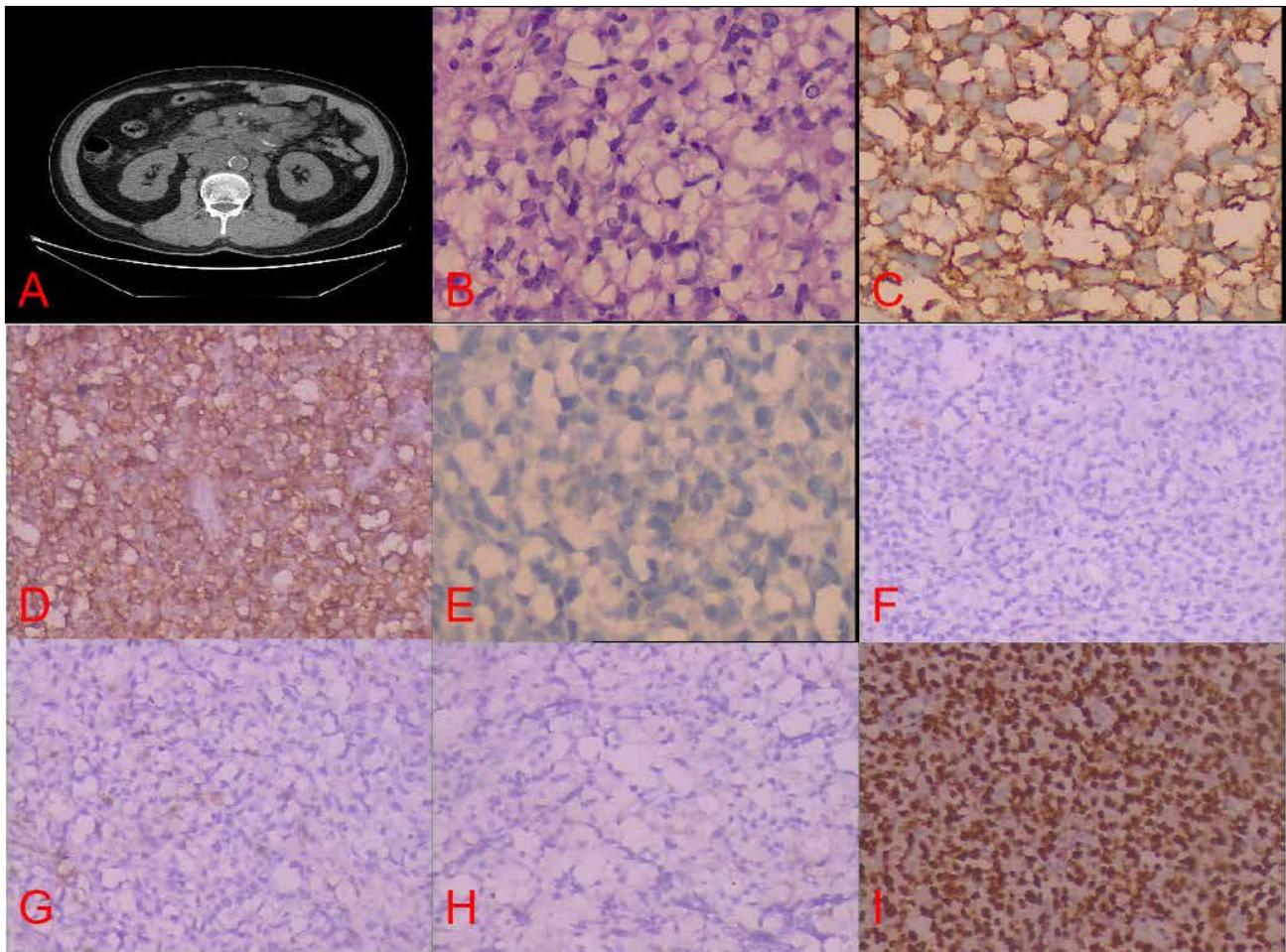
<sup>#</sup>The authors contribute equally

## 1 Introduction

Signet ring cell lymphoma is a rare type of non-Hodgkin lymphoma, in which the tumor nucleus is on the side of the cell, just like a signet ring, in morphology [1]. Signet ring cell lymphoma could develop from B cell or T cell [2]. The biological behavior and clinical manifestations of signet ring B cell lymphoma might be similar to the lymphoma originating from the germinal center. In our study, the clinic-pathological features of the case were provided and much attention should be paid by pathologists and hematologist during the diagnosis.

## 2 Case report

A 63-year-old man suffered from abdominal pain for two months and multiple enlarged lymph nodes were found in the retroperitoneum by abdominal CT scan (Figure 1A). Enlarged lymph node in the neck and mediastinum was not found. Fine needle biopsy was carried out and neoplastic cells distributed diffusely which were consistent with clear cytoplasm in morphology. The nucleus was squeezed to the side showing the appearance of signet ring (Figure 1B). The tumor cells were positive for CD20 (Figure 1C), CD45 (Figure 1D), Bcl-2 and Vimentin, while negative for AE1/AE3 (Figure 1E), EMA (Epithelial Membrane Antigen) (Figure 1F), CD3 (Figure 1G), CD10, CD5, Bcl-6, Kappa, Lambda, MUM1 and S-100 (Figure 1H). The positive rate of Ki67 was more than 80% (Figure 1I). PAS (Periodic Acid Schiff) staining was negative. In summary, the diagnosis of retroperitoneal signet ring B cell lymphoma was made on the basis of histological morphology and immunohistochemical staining results. The patient then received six courses of R-CHOP (Rituximab, Cyclophosphamide, Hydroxydaunorubicin, Oncovin, Prednisone) chemotherapy and achieved partial remission. However, the patient unfortunately died of multiple organ failures secondary to infection from tumor recurrence at the 34th month after diagnosis.



**Figure 1:** Imaging, microscopic, and immunophenotypic findings of the case: Abdominal CT scan showed multiple enlarged lymph nodes (A); Staining shows the appearance of tumor cells like signet ring (B) (H&E, High magnification); Immunophenotypic examination revealed that the tumor cells were CD20 (C), CD45 (D) positive and negative for AE1/AE3 (E), EMA (F), CD3 (G) and S-100 (H). The positive rate of Ki67 was more than 80% (I). (EnVision, High magnification).

**Ethical approval:** The research related to human use has been complied with all the relevant national regulations, institutional policies and in accordance the tenets of the Helsinki Declaration, and has been approved by the authors' institutional review board or equivalent committee.

**Informed consent:** Written informed consent was obtained from the family of this patient for publication of this manuscript and any accompanying images.

### 3 Discussion

Signet ring cell lymphoma is rare. The initial goal should be to eliminate metastasis of the signet ring cell from gastrointestinal tract and liposarcoma [3,4]. This is not only due to lymph node metastasis being more common than

the signet ring cell lymphoma, but it is more important to judge the origin of tumor correctly. Immunohistochemical staining of AE1/AE3, S-100, CD45 and CD20 have a great help in distinguishing these two kind of diseases. As far as our present case was concerned, negative expression of AE1/AE3 and S-100 could be helpful in ruling out the signet ring cell carcinoma and liposarcoma separately. CD45 was expressed positively in the tumor cells which indicated lymphocyte origin and CD3, CD5 negative expression could exclude T cell lymphoma.

According to the different inclusions in the cytoplasm of tumor cells, signet ring cell lymphoma could be divided into three types [5]. Transparent vacuolar type shows clear vacuoles in the cytoplasm of tumor cell while special staining for PAS, mucus and fat are negative. Immunohistochemical detection of monoclonal immunoglobulin might be positive at the margin of vacuoles; Russell body type shows presence of Russell small body. PAS and monoclo-

nal IgM antibodies in the cytoplasm could be observed by immunohistochemistry under electron microscopy; Atypical type shows inclusion bodies are not clear in boundary and PAS staining is negative. The emergence of the inclusions might be related to the obstacle during the course of the synthesis, carrying and releasing of immunoglobulin [6]. Due to the obstacle in the course of immunoglobulin moving from the rough endoplasmic reticulum to the golgi complex, Russell body inclusions were formed; The atypical type was formed by immunoglobulin accumulation in the golgi lysosome system leading to transparent type cavity inclusions. In our case, clear vacuoles could be observed in the cytoplasm of the tumor cells appearing as signet ring cell.

The prognosis of signet ring cell lymphoma is still unclear. The patient in present study died of multiple organ failures secondary to infection at 34th month after diagnosis although he received six courses of R-CHOP. Much more clinical data need to be accumulated to clarify the prognosis of this kind of tumor in the future.

**Acknowledgements:** Yantai Key Research and Development Project (2017WS101).

**Conflict of interest:** No author has competing interests.

## References

- [1] Tungekar MF. Gastric signet-ring cell lymphoma with alpha heavy chains. *Histopathology*. 1986,10, 725-733
- [2] Weiss LM, Wood GS, Dorfman RF. T-cell signet-ring cell lymphoma. A histologic, ultrastructural, and immunohistochemical study of two cases. *Am J Surg Pathol*. 1985, 9, 273-280
- [3] George SA, Junaid TA. Gastric marginal zone lymphoma of mucosa-associated lymphoid tissue and signet ring cell carcinoma, synchronous collision tumour of the stomach: a case report. *Med Princ Pract*. 2014, 23, 377-379
- [4] Wang J, Katz RL, Stewart J, Landon G, Guo M, Gong Y. Fine-needle aspiration diagnosis of lymphomas with signet ring cell features: potential pitfalls and solutions. *Cancer Cytopathol*. 2013, 121, 525-532
- [5] Gore CR, Panicker NK, Kumar H, Buch A, Chandanwale SS. A rare case of signet ring cell lymphoma: Diagnosis aided by immunofluorescent staining. *J Cytol*. 2017, 34, 56-58
- [6] Sakai K, Yamasaki N, Notohara K, Ueda Y. Signet ring cell "lymphoma": mimicking the appearance of signet ring cell carcinoma. *Int J Hematol*. 2016, 103, 481-482