Imaging of a rare location, extra nodal lymphoma lesions
Published on 06.08.2019

ISSN: 1563-4086
Section: Abdominal imaging
Area of Interest: Abdomen Contrast agents
Haematologic
Procedure: Contrast agent-intravenous
Procedure: Education
Procedure: eLearning
Imaging Technique: CT
Imaging Technique: Ultrasound
Imaging Technique: Ultrasound-Colour Doppler
Special Focus: Acute Education and training
Haematologic diseases Case Type: Clinical Cases
Authors: Vasiliki Bizimi, Ioanna Maria Kostoula, María Mademli, Natali Sideri, Ornella Moschovaki-Zeiger, Stylianos Argentos, Olympia Papakonstantinou
Patient: 74 years, female

Clinical History:
A 75-year-old female patient presented to the emergency department with shortness of breath and referring chronic weakness. The only known history was dyslipidaemia. ECG showed heart arrhythmia. Laboratory initial investigations revealed pancytopenia (anaemia with lymphocytosis), elevated both CRP: 40.5 mg/L and LDH: 322 U/L, suggesting a lymphoproliferative disorder.

Imaging Findings:
Ultrasound (US) showed hepatomegaly and several avascular, hyperechoic, with hypoechoic centre subcutaneous lesions, of the lower thoracic and abdominal wall, with a diameter from 1 to 3 cm, indistinguishable from reactive (oval shaped with normal hyperechoic hilum or increased blood flow and anechoic area with no blood flow), or metastatic lymph nodes (hypoechoic, no clear hilum) (Fig 1.).
Contrast-enhanced ultrasound (CEUS) after a bolus intravenous injection of 2 ml of SonoVue™ solution, followed homogenous slow enhancement of the lesions during the arterial phase with no apparent wash out, comparing with the surrounding tissues (Fig 2.).
Contrast-enhanced computed tomography (CT) of the thorax and abdomen showed multiple, enhancing nodules of both lungs, peribronchial thickening and mediastinal slightly enlarged axillary lymph nodes with normal architecture. Enhancing subcutaneous nodules in the anterior upper abdominal and lower chest wall were confirmed (Sagittal MPR and axial CT image Fig. 3a, b).

Discussion:

Background:
Lymphoproliferative disorders are either Hodgkin or non-Hodgkin lymphomas (NHLs). The prevalence of NHLs increases with age. Diffuse large B cell lymphoma (DLBCL) is aggressive and accounts for 30% of NHL. Most patients are not diagnosed until the disease is advanced (stage III or IV). Extranodal extramedullary disease occurs in up to 40% of patients with DLBCL and may originate in the skin or subcutaneous tissue (comprising 18% of all extranodal lymphomas and 5% of all NHLs) and can either be secondary or primary (rare) [1,2].

Clinical perspective:
- Lymphoma may involve the skin, subcutaneous tissues, and muscles of the abdominal wall by contiguous extension or as isolated nodules.
- Cutaneous and subcutaneous mesenchymal malignancies and cutaneous metastases from internal malignancies is rare (about 0.7–10% of cases) [3,4,5].
- US-FNAB should be performed.

Imaging perspective:
The imaging appearance is nonspecific, and the diagnosis is primarily based on diffuse or systemic lymphoma involvement.
Positron emission tomography (PET) is critical in the diagnosis, staging, response assessment and therapeutic decision making, of DLBCL. Magnetic resonance imaging (MRI), CT, US and conventional radiography are also used. Final diagnosis should comprise biopsy.
Both cutaneous and extra cutaneous involvement is important in staging and therapy planning, which is difficult when evaluating with CT, because non-enlarged lymph nodes could have lymphomatous involvement.
Cutaneous lymphoma imaging findings are often nonspecific, including a large mass, nodal or confluent nodal structures, small nodules (<1 cm) and disseminated myositis and panniculitis. A mass-like homogeneous hypohyperechogenicity with an infiltrative margin can be seen on sonography. Hypervascularity compared with the surrounding tissues on colour Doppler may be seen [6]. On cross-sectional imaging, homogeneous or heterogeneous arterial enhancement can be seen [7,8,9].
Bone marrow biopsy and excisional biopsy of 3 subcutaneous lesions verified DLBCL, stage IV.

Outcome:
Although aggressive, DLBCL is considered potentially curable. Treatment is a combination of chemotherapy plus immunotherapy. However, if left untreated, it can lead to death.

Take-Home Message-Teaching Points:
- Heterogeneous focal subcutaneous lesions in a patient with a primary neoplastic focus indicates high probability of metastases. Other primary tumours, as well as non-neoplastic lesions and primary lymph node diseases, should also be considered in the differential diagnosis.

- Extranodal lymphoma is a diagnostic challenge due to imaging overlap with other malignant and benign processes, especially when primary.
- Extranodal involvement is of great importance on staging and management for patients with NHL.
- Imaging provides important information for staging and response assessment.

Written informed patient consent for publication has been obtained.

**Differential Diagnosis List:** Diffuse large B cell lymphoma (DLBCL), stage IV, Lymph nodes, Granulomas,
Subcutaneous mesenchymal malignancies, Cutaneous lymphoma lesions, Metastases

**Final Diagnosis:** Diffuse large B cell lymphoma (DLBCL), stage IV

**References:**


Description: Abdominal ultrasound (US) showed hepatomegaly and multiple hyperechoic with hypoechoic centered lesions, in the subcutaneous tissue of the lower thoracic and abdominal wall with a diameter from 1 to 3 cm Origin: 2nd Radiology Department "ATTIKON" University Hospital, Athens/2018
Description: Further examination of the subcutaneous nodules was performed with the use of Contrast-enhanced ultrasound (CEUS). After a bolus intravenous injection of 2 ml of SonoVue™ solution, there was homogenous slow enhancement of the lesion during the arterial phase with no apparent wash out in the late phase. Origin: 2nd Radiology Department “ATTIKON” University Hospital, Athens/2018
**Figure 3**

Description: Sagittal MPR and axial CT images show multiple enhancing subcutaneous nodules in the anterior upper abdominal and lower chest wall. **Origin:** 2nd Radiology Department “ATTIKON” University Hospital, Athens/2018
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