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Original article

Endoscopic ultrasound-guided fine-needle aspiration and cytology for differentiating benign from malignant lymph nodes

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ABSTRACT

Background and study aims: Intra-abdominal and mediastinal lymphadenopathy are often difficult to diagnose, particularly in the absence of a primary lesion. Endosonography (EUS)-guided fine-needle aspiration and cytology (FNAC) has provided an easy and safe access to these lymph nodes, sparing the use of invasive and costly interventions. The main aim of this study is to assess the specificity, sensitivity, and predictive value of EUS-guided FNAC in the diagnosis of benign and malignant lymph nodes. In addition, the study aims to determine significant EUS features that could help in predicting lymph node malignancy.

Patients and methods: This prospective study included 142 patients with intra-abdominal or intrathoracic lymphadenopathy who were referred for EUS-guided FNAC because of inaccessibility by other imaging modalities. Ninety (63.3%) patients were found to have malignant lymph nodes, and 52 (36.6%) had lymphadenopathy of benign nature.

Results: EUS-guided FNAC had a sensitivity and specificity of 92% and 100% respectively. It had positive and negative predictive values of 100% and 88% for malignancy, respectively. By logistic regression analysis, EUS features and shortest diameter were found to be potential predictors of malignancy with p-value of <0.0001.

Conclusion: EUS-guided FNAC is a powerful modality in the diagnosis of benign and malignant lymph nodes. Additional complementary EUS features could be added to this technique for definitive diagnosis.

Introduction

EUS has an increasing fundamental role in the diagnosis and staging of many gastrointestinal (GI) tumours [1]. The diagnosis of GI tumour-associated lymphadenopathy or isolated intra-abdominal lymphadenopathy remains a challenge to many physicians. EUS had assisted in solving this problem by providing a closer access to these lymph nodes (LNs), enabling their fine needle aspiration and cytology (FNAC) [2]. The main aim of this study is to assess the accuracy and predictive value of EUS-guided FNAC in the diagnosis of benign and malignant LNs.

The main aim of this study was to assess the specificity, sensitivity, and predictive value of EUS-guided FNAC in the diagnosis of benign and malignant LNs. Moreover, he study aims to find significant EUS features other than FNAC that could help in predicting LN malignancy.

Patients and methods

This study is a prospective study conducted on patients referred to the Endoscopy Unit at Internal Medicine Department of Faculty of Medicine, Cairo University. The protocol was approved by the local ethical committee. It included 183 patients, of which 41 were lost at follow-up (22.4%), and we could reach a final diagnosis in 142 patients (77.5%).

Patients included in the study were 79 (55.6%) males and 63 (44.4%) females. Their age ranged from 17 to 70 years old, with a mean age (SD) of 56 (10) years and 95% confidence interval, CI: 54.2–57.6.

The patients included were referred for the assessment of their LN status starting from January 2012 to February 2016. Patients

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with isolated intra-abdominal lymphadenopathy were 74 (52.2%); 59 (41.5%) had an associated primary GI tumour, while 9 (6.3%) patients had isolated mediastinal lymphadenopathy.

All patients fulfilled the following inclusion criteria:

1. Patients referred for EUS-guided FNAC of their LNs that were inaccessible by CT or ultrasound because of transposition of sizable vessels or vital organs.
2. Patients referred for EUS assessment of abdominal masses with associated LNs for TNM staging of the tumour.

Exclusion criteria included

1. Final diagnosis not settled, as in patients with no definite cytopathological diagnosis or patients lost to follow-up.
2. Patients who unfit for propofol administration or had severe coagulopathy.

EUS was performed for all referred patients after an informed consent. Patient names were omitted and replaced by numerical codes.

The procedure was performed under deep sedation (with intravenous propofol). EUS curved linear array machine was used (Pentax EG-3830UT Echo-endoscope, HOYA Corporation, PENTAX Life Care Division, Showanomori Technology Center, Tokyo, Japan) connected to an ultrasound unit (Hitachi EUB-7000, Hitachi Medical System, Tokyo, Japan).

Target LNs were initially identified, and their endosonographic features were assessed including size, longest diameter, shortest diameter, and the ratio of the shortest to the longest diameter, echotexture (echogenic or echopoor), and its hilum (lost or preserved)[3] (Figs. 1–3).

Elastography was then displayed with the B-mode image in a colour scale that ranged from red for components with greatest elastic strain (i.e., softest components) to blue for those with no strain (i.e., hardest components). The EUS elastographic image was matched with an elasticity colour scale present on the side of each image (Figs. 4 and 5). Elastography scoring patterns used were as follows [4]:

Pattern 1: >80% of the cross-sectional area was red or green, i.e., soft.

Pattern 2: >50% but <80% was red or green.

Pattern 3: >50% but <80% was blue.

Pattern 4: >80% of the cross-sectional area was blue, i.e., hard.

EUS-guided FNAC was carried out using a 22-gauge needle in 135 (95%) patients, while a 19-gauge needle was used in 7 (5%) patients, passing through the esophageal, gastric, or duodenal walls (Echotip®; Wilson-Cook, Winston Salem, NC). Once guided into the target lesion, the needle was moved back and forth within the LN while applying suction with a 20-ml syringe.

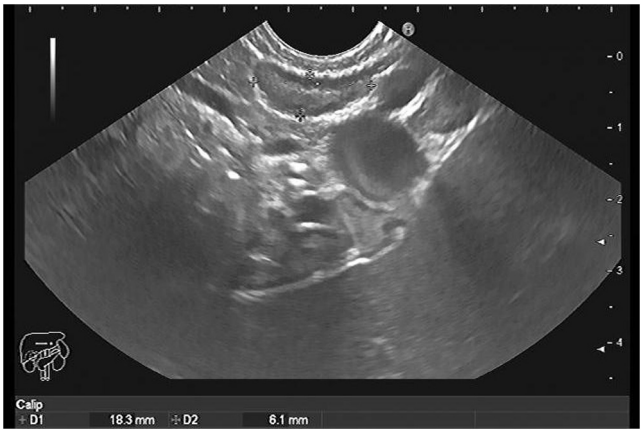

Fig. 1. Small elongated benign portahepatis LN with preserved hilum.

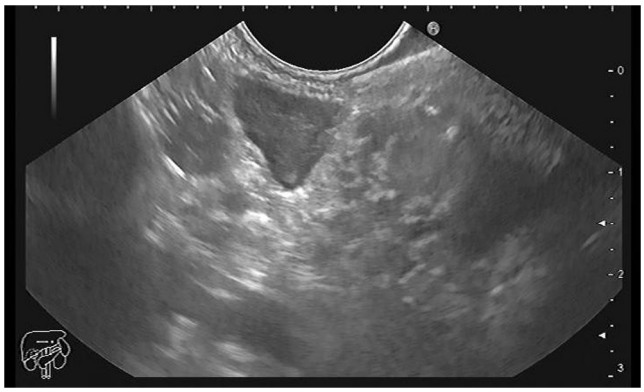

Fig. 2. Small echopoor malignant peripancreatic LN with lost hilum.

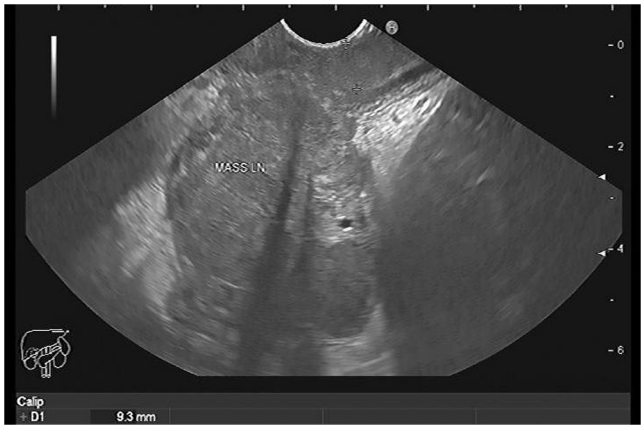

Fig. 3. Large malignant globular perigasrtic LN with lost hilum.

The number of passes ranged from one pass in 95 (66.9%) patients, 2 passes in 40 (28.2%), 3 passes in 6 (4.2%), and 4 passes in only one patient (0.7%).

Alcohol (95%)-fixed slides and formaldehyde (formalin) blocks were prepared immediately and then sent for cytological and histological studies with haematoxylin and eosin and immunohistochemistry (IHC) if needed. Rapid on-site evaluation (ROSE) was performed in 16 patients only.

The patient was followed for 6 h to detect any procedure-related complications. However, no major complications were encountered.

The patient's referring physician was contacted for further information on clinical monitoring, other diagnostic methods, and the final diagnosis.

EUS diagnosis suggestive of malignant or benign lymphadenopathy depended on the presence of ≥2 features of:

- Echogenicity (echopoor for malignancy and echogenic for benign LNs) [5].
- Transverse to longitudinal diameter ratio (>0.5 for malignant and <0.5 for benign LNs) [6,7].
- Loss of hyperechoic hilum for malignancy and preserved hilum for benign LNs [8].

LNs were considered benign when they fulfilled at least 2 of the following criteria:echogenic preserved hilum, transverse to longi-

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