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Image-guided core needle biopsy in the diagnosis of malignant lymphoma

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Abstract

Objective: Current European Society for Medical Oncology (ESMO) guidelines recommend that when feasible, surgical excision biopsy (SEB) is the ideal for diagnosis, sub-typing and grading of malignant lymphoma. We undertook this retrospective study to assess the diagnostic accuracy of image-guided core needle biopsy (CNB) in the diagnosis of malignant lymphoma, to identify the proportion of cases from which oncological treatment was subsequently instigated from the CNB diagnosis, and to evaluate the potential role for minimally invasive CNB techniques in the diagnostic pathway of malignant lymphoma.

Methods: All cases of lymphoma amenable to CNB between 2008 and 2013 were included. Patient records were reviewed to identify the biopsy diagnostic pathway undertaken (fine needle aspiration cytology, CNB, surgical excision biopsy). CNB specimens were graded as fully diagnostic (tumour sub-typing/grading and treatment initiated), partially diagnostic (diagnosis of lymphoma but more tissue required for sub-typing/grading), equivocal or inadequate. The effects of anatomical location, needle gauge, number of core specimens and sub-type of disease on the diagnostic yield of the sample were analysed.

Results: 262 patients and 323 biopsy specimens were included in the study. 237 patients underwent CNB as the initial diagnostic intervention. In 230/237 CNB was fully diagnostic (97%), allowing initiation of treatment. In 7 patients, SEB was necessary in addition to CNB to provide additional diagnostic information to allow initiation of treatment. In 72 patients, SEB was the only diagnostic test performed.

Conclusion: Our study showed that in 97% of suitable cases, CNB provided sufficient diagnostic information to allow treatment of malignant lymphoma to be instigated. This minimally-invasive technique is well tolerated and has advantages over surgical techniques, including reduced costs, post-procedural complications and delays on the diagnostic pathway. CNB may obviate the use of surgical techniques in the majority of suitable cases, however its success is dependent on close collaboration and acceptance by clinicians and pathologists.

Keywords: Lymphoma; Core needle biopsy; Surgical excision biopsy

Introduction

To allow the timely instigation of appropriate oncological therapy in cases of malignant lymphoma, tissue sampling is essential to confirm the diagnosis, and to subclassify the lymphoproliferative disease.[1] Although the importance of core needle biopsy (CNB) for deeper lymph nodes is recognised in the current European Society for Medical Oncology (ESMO) Clinical Practice Guidelines for diagnosis, treatment and follow up of haematological cancers, for peripheral lymph nodes with no surgical risk, the recommended reference standard diagnostic intervention is surgical excision biopsy (SEB) of a whole node.[2] However, the diagnostic utility of image-guided CNB in lymphoma diagnosis is being acknowledged in published literature, and as such, it is increasingly considered a valid alternative method of tissue sampling, as it is less

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expensive, less invasive and has fewer associated complications than SEB.[3,4] CNB has struggled to gain wider acceptance in the haemato-oncological setting because of perceived limitations in the diagnosis and sub-typing of neoplasms associated with small specimen size,[4] although recent advances in immunohistological techniques have greatly improved the ability of the general histopathologist to make accurate diagnoses from smaller specimens.[5] Frequent reports in the literature of CNB as a diagnostic tool in the oncological setting, particularly in the diagnostic work-up of salivary gland, liver, chest and breast lesions,[6] have demonstrated the value of this intervention as an alternative tissue sampling technique – in most cases providing a definitive diagnosis to guide clinical management, without the need for further, more invasive SEB.

We performed this retrospective analysis to evaluate the diagnostic efficacy of CNB specifically in the clinical context of malignant lymphoma, and to determine whether the information obtained by updated immunohistological techniques can provide sufficient tumour typing and characterisation data to instigate further treatment, thus avoiding SEB in suitable cases. We also discuss how CNB can incorporate into the diagnostic pathway for lymphomas, allowing tissue referral for specialist haematopathologist confirmation of diagnosis whilst other investigations/imaging are undertaken, and without excessive delays in treatment initiation.

Patients and methods

All patients diagnosed with malignant lymphoma (including Hodgkin's Disease (HD) and Non-Hodgkin's lymphoma (NHL) sub-types) at Eastbourne District General Hospital over a six-year period between 2008 and 2013 were identified by a Systematized Nomenclature of Medicine (SNOMED) search of the hospital's APEX® pathological information system, and their records subsequently retrieved for review and data collection. Providing the patient records and imaging history were available, all patient data were included in this review. There were no exclusions based on age, gender, sub-type of disease, or recurrence of presentation. Patients referred from other institutions for second opinion (n = 6) and those for whom a usable data set could not be obtained (n = 2) were excluded from the analysis. For 74 patients where the anatomical site was considered inaccessible or unsuitable for image-guided CNB (42 skin, 29 bowel and 3 brain lesions), these data were also excluded from the analysis.

All CNB were performed by Consultant Radiologists using either ultrasound (ultrasound-guided core biopsy = USCB) or computed tomography (computed tomography-guided core biopsy = CTCB) guidance, and were conducted under local anaesthesia. USCB procedures were undertaken in the out-patient setting, and CTCB were performed as in-patients. A pathologist was not present at the time of the procedure, so each specimen was visually inspected, and multiple cores were collected until the Consultant Radiologist was satisfied with the size of the sample retrieved. A spring-loaded automated biopsy gun was used in all procedures, with variable 15–22 mm needle throw, and needle size ranging from 14 to 20G depending on operator preference and anatomical location. Tissue biopsies (CNB and SEB) were processed in a standard manner in a local district general hospital histopathology laboratory. Immunohistochemistry using commonly available monoclonal antibodies was carried out and interpreted by general histopathologists to provide a provisional diagnosis. From 2009 onwards, all cases were then referred to a specialist haematopathology laboratory for confirmation, further immunohistochemistry and molecular genetic studies as indicated. Prior to this (2008–2009), only complex cases were referred for specialist haematopathology opinion. If there was a difference in opinion between the on-site provisional and referral centre diagnoses, the external report was taken as reference.

The patient records were reviewed to identify the diagnostic pathway undertaken to reach the final diagnosis of lymphoma. Where available from the records, the following data were collected and entered into a database for analysis;

- type of intervention (e.g. blind or image-guided fine needle aspiration cytology (FNAC), USCB, CTCB, SEB);
- biopsy site (e.g. salivary gland, inguinal lymph node);
- needle gauge (for CNB);
- number of tissue cores obtained (as stated on pathology report);
- specimen adequacy for histopathological reporting;
- sampling technique providing the diagnosis of lymphoma upon which treatment was instigated;
- subsequent biopsies/surgery and change in diagnosis;
- change in biopsy patterns over the study period;
- patients with an apparently diagnostic CNB who underwent additional SEB and reasons why (data obtained from patient records and multi-disciplinary meeting records);
- patients who had SEB only and any explanatory patterns in the referral pathway;
- patterns of pathology in non-diagnostic specimens, and whether any particular sub-type of disease was more difficult to diagnose.

Terminology

The following definitions were used for key terms used to grade the diagnostic quality of the biopsy specimens;

- Fully diagnostic – samples were considered to be fully diagnostic if there was adequate material provided in the specimen to allow a diagnosis of lymphoma, such that appropriate treatment was instigated from the biopsy diagnosis.