Laparoscopic retroperitoneal/mesenteric lymph node sampling: a safe and effective technique

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ABSTRACT

Introduction: Needle aspiration and core biopsies are commonly used to assess retroperitoneal lymph nodes. However, the tissue obtained by this method is insufficient to define and type the tumour. This article demonstrates the feasibility and safety of the laparoscopic approach in obtaining an adequate volume of lymph node tissue for typing.

Methods: Laparoscopic retroperitoneal lymph node biopsy was performed on 12 patients over a period of five years. A pneumoperitoneum was induced with a Veress needle, and an initial 10-mm trocar was inserted in the sub-umbilical region in order to carry a 30-degree telescope. Two or more 5-mm ports were inserted into the targeted areas under laparoscopic guidance to achieve optimal triangulation in order to access the nodal tissue.

Results: The procedure was successful in 11 out of the 12 patients. An average volume of 1.7 cm^3 of tissue was harvested for each patient. In one patient with preoperatively undiagnosed portal hypertension, laparoscopy was converted to an open procedure due to bleeding. In all patients, the histology was adequate and contributed to the diagnosis, allowing rapid institution of treatment. The diagnosis was reactive lymphadenopathy in three patients and sarcoidosis in one patient. Seven others suffered from various conditions, including lymphoma, leukaemia, secondary from unknown origin and Castleman's disease.

Conclusion: Laparoscopy allows access to perihepatic and perisplenic areas, and is a procedure of choice when needle biopsy is not possible or fails to provide an adequate sample.

Keywords: laparoscopy, lymph node, lymphoma

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INTRODUCTION

Laparoscopy is increasingly used for retroperitoneal lymph nodal dissection in urological and gynaecological malignancies.[1-4] However, sampling or biopsy of retroperitoneal lymph nodes for various haematological and oncological conditions is rarely used. Instead, needle aspiration and core biopsies of retroperitoneal lymph nodes are commonly used. However, the tissue obtained by this route is insufficient to further define and type the tumour.[5] The objective of this study was to assess the feasibility, safety and efficacy of the laparoscopic technique. Here, we share our views and experience of laparoscopic retroperitoneal/mesenteric lymph node biopsy performed for diagnostic reasons.

METHODS

In 2002–2009, we performed laparoscopic retroperitoneal lymph node biopsy on 12 patients at University Hospital Lewisham; all were performed as day case procedures. Most patients were referred by haematologists and physicians, and had already undergone computed tomography (CT) to identify the retroperitoneal disease, making it easier to target the appropriate nodes. All patients underwent ultrasonography (US) or CT-guided lymph node biopsy on the first instance. Histologically, the samples were insufficient and did not have a targeted tissue for the pathologist to confirm the pathology. Endoscopic US may be useful in obtaining targeted biopsy,[6] but the volume of the specimens retrieved was inadequate with regard to typing and subtyping. Therefore, the patients were referred by the haematologists for a biopsy, specifying the volume of tissue to be obtained.

A standard laparoscopic technique was used in all cases. Pneumoperitoneum was induced with a Veress needle, and an initial 10-mm trocar was then inserted in the sub-umbilical region in order to carry a 30° telescope. Two or more 5-mm ports were inserted in the targeted areas under laparoscopic guidance to achieve optimal triangulation in order to access the nodal tissue. The small bowel, greater omentum and transverse colon were all shifted toward one side by tilting the operating

Table I. Details of patients who underwent laparoscopy and retroperitoneal lymph node biopsy.

Patient no.	Age (yrs); gender; symptoms	Lymph node biopsied	Histology	Comments
1	74; F; Crohn's disease on azathioprine, generally unwell	Coeliac (22 mm ×10 mm × 6 mm)	Reactive lymph node	CT image showed splenomegaly and numerous para-aortic lymphadenopathies
2	66; M; abdominal pain	Lymph node from lesser omentum and pre-aortic tissue (12 mm × 9 mm × 7 mm)	Pre-aortic tissue: fat, Lymph node: Castleman's disease	
3	75; F; abdominal pain	Coeliac (11 mm × 6 mm × 6 mm)	No evidence of metastases	Had a liver biopsy: granuloma
4	33; F; abdominal pain and weight loss	Mesenteric node (8 mm × 8 mm × 12 mm)	Follicular lymphoma grade 1	
5	31; F; mass right hypochondrium and splenomegaly and para-aortic nodes	Mesenteric node (18 mm × 3 mm × 13 mm)	Follicular lymphoma Grade 3 Stage IVa	
6	59; F; mass right hypochondrium and splenomegaly	Mesenteric node (15 mm × 3 mm × 12 mm)	Diffuse large B cell lymphoma	
7	64; M; splenomegaly	Para-aortic (22 mm × 20 mm × 14 mm)	Granulomatous lymphadenitis	Probable sarcoidosis
8	52; F; unwell	Coeliac node (13 mm × 12 mm × 12 mm)	Castleman's disease	
9	59; M; unwell	Porta hepatis nodes (17 mm × 10 mm × 8 mm)	Chronic lymphatic leukaemia	
10	36; M; abdominal pain of unknown cause	Greater curve node(10 mm × 5 mm × 2 mm); lymph node (15 mm × 9 mm × 6 mm) and separate grey fragment (21 mm); lymph node (12 mm × 7 mm × 6 mm) with attached fatty tissue (15 mm); single lymph node (8 mm × 6 mm × 3mm)	Metastatic tumour expressing epithelial markers	Metastatic tumour expressing epithelial markers, most probably poorly differentiated carcinoma; a non-seminomatous germ cell tumour cannot be excluded
11	72; M; abdominal pain	Tissue from abdominal mass (omentum) (25 mm × 20 mm ×10 mm); tissue from large bowel	Diffuse large B cell lymphoma	

F: female; M: male; CT: computed tomography

table as required. The 'head up' position was mostly used. The coeliac lymph nodes were approached by dissecting through the lesser sac. Para-aortic nodes were reached by dissecting the posterior peritoneum left of the duodenojejunal flexure. Using instruments with bipolar attachments and laparoscopic Babcock forceps (Mediflex, Islandia, NY, USA) to steady the mass of nodes with minimum manipulation, the nodes were dissected and sampled. On average, a 25 mm × 25 mm mass of tissue was aimed for. Haemostasis was achieved with bipolar rather than monopolar diathermy due to the close proximity of the bowel loops. The 10-mm port site was closed with a 1-0 PDS® suture with a J needle (Ethicon, New Brunswick, NJ, USA) to the fascia. The skin and the remaining port sites were closed using skin glue. The tissue volume that was harvested was calculated in mm^3 (volume = length × breadth × width), based on the histology report. If the width was not reported in the histology, then it was assumed that the width and breadth were equal for statistical calculations.

RESULTS

We attempted diagnostic laparoscopy and retroperitoneal/mesenteric lymph node biopsy (RPLNB) in 12 patients, and the average volume of the tissue obtained was 1,798 (range 312–6,160) mm^3. In one patient with undiagnosed portal hypertension, RPLNB was converted to an open procedure due to bleeding. RPLNB was successful in 11 out of the 12 patients (91.6%). The median operating time was 20 (range 23–45) minutes. All procedures were performed by a single laparoscopic surgeon. In all patients, the volume sampled was

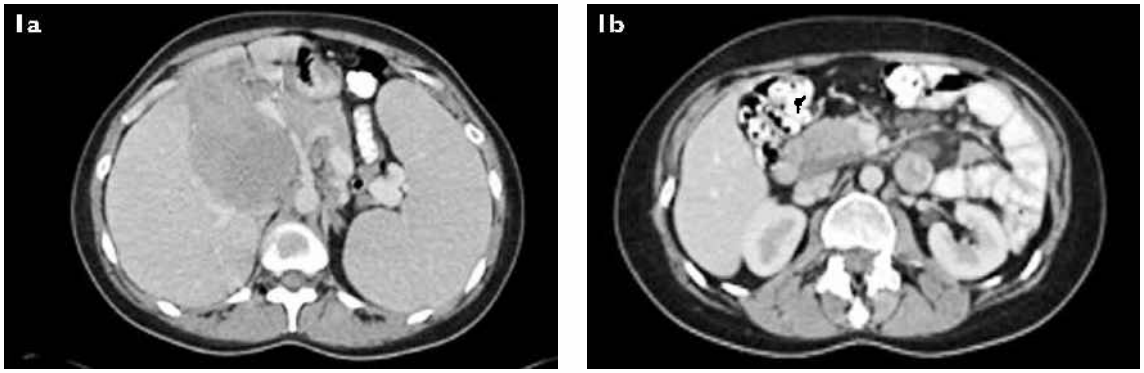

Fig. 1 CT image of the abdomen (transverse section) shows retroperitoneal lymph nodes (a) before and (b) after chemotherapy.

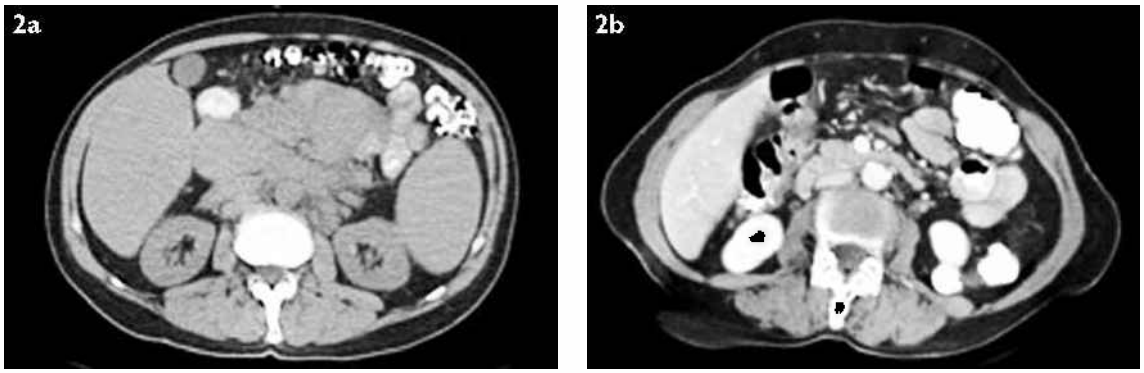

Fig. 2 CT image of the abdomen (transverse section) shows para-aortic lymph nodes (a) before and (b) after chemotherapy.

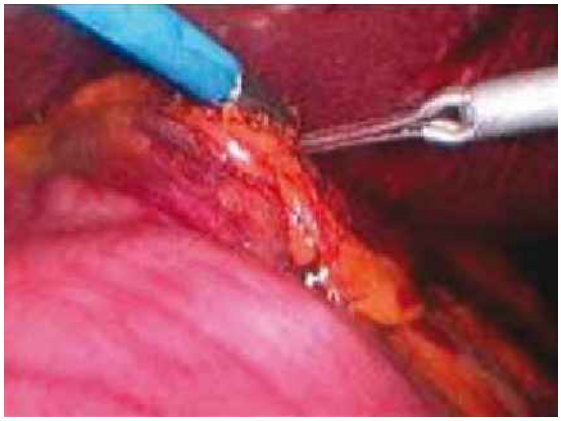

Fig. 3 Intraoperative photograph shows laparoscopic sampling of coeliac lymph nodes.

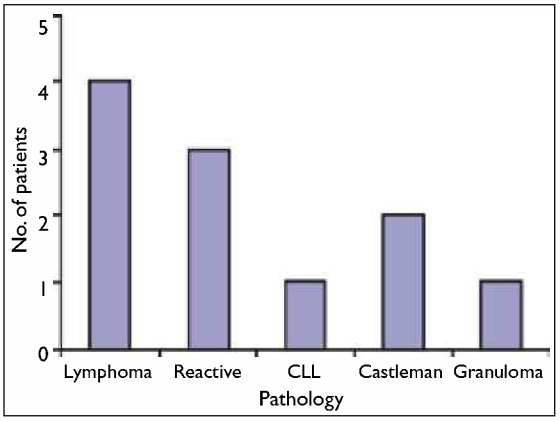

Fig. 4 Graph shows a summary of the pathology of the lymph glands that were obtained from laparoscopic lymph node biopsies per the histology.

adequate and contributed to the diagnosis, allowing rapid institution of treatment. Histology of three patients demonstrated reactive lymphadenopathy. One suffered from granulomatous lymphadenitis, one from probable sarcoidosis and one was reported as reactive. The remaining seven patients with multiple retroperitoneal lymphadenopathies suffered from various conditions, including lymphoma, leukaemia, secondary from unknown origin and Castleman's disease. Apart from one patient requiring conversion to open, we did not have any complications in our series.

Table I summarises the results in detail. Figs. 1 & 2 show the CT images of the abdomen before and after chemotherapy in patients diagnosed with lymphomas, based upon laparoscopic nodal biopsies. Fig. 3 shows the laparoscopic view of a coeliac lymph node biopsy, while Fig. 4 summarises the results of various pathologies.

DISCUSSION

Retroperitoneal lymphadenopathy occurs in various conditions, including haematological malignancies,

secondaries from tumours of testes, ovaries and cervix, infections such as tuberculosis and retroviral disease and sarcoidosis. CT is the most useful imaging modality for assessment of the retroperitoneal space,[7] and may identify other pathologies involving organs such as the spleen, liver, pancreas, kidneys and intestines. It may also help the surgeon to focus on a particular nodal group during laparoscopy. CT- or US-guided needle sampling is often performed under radiography control for obtaining nodal tissues from retroperitoneal disease. The limited amount of material obtained though this method may not be adequate for a proper tissue diagnosis. It is often insufficient for detailed typing in lymphomas to determine the most appropriate chemotherapeutic regimen. Trephine biopsies of bone marrows may not show the disease until it has been involved.

When radiological and marrow biopsies fail to contribute to the diagnosis, laparotomy or laparoscopy is done to obtain a retroperitoneal node biopsy and biopsies of other diseased intra-abdominal organs. Laparotomy may help to reach a diagnosis, but may often delay the starting of chemotherapy by a few weeks, as healing of the large abdominal wall wound slows down if chemotherapy is started early. The advantages of laparoscopy and biopsy of retroperitoneal lymph nodes are numerous.[8] Firstly, one can visualise the entire peritoneal cavity as well as organs such as the liver, spleen and intestines. Secondly, any suspicious areas on these organs can be biopsied, and thirdly, an adequate volume of biopsy specimens can be taken so that the lymphoma can be subtyped. Since this is a minimally invasive technique, the small wound heals quickly, allowing therapeutic chemotherapy to start as soon as possible. The reduction in diagnostic delay allows the cancer targets to be met and the institution of appropriate treatment within 62 days. Laparotomy or laparoscopy may also provide staging of infra-diaphragmatic Hodgkin's lymphoma.[9,10] However, with the advent of CT, laparoscopy is no longer performed for staging. Although there are occasional reports of development of lymphocele after RPLNB,[11] we did not come across any such complications.

The published literature on retroperitoneal lymph node biopsy in retroperitoneal lymphadenopathy is limited. According to a large published retrospective study conducted at the Mayo clinic on 94 patients who underwent laparoscopy, the success rate of obtaining a tissue sample was 83%. Adhesions, bleeding and poor intraoperative exposure resulted in conversion to an open procedure in the remaining patients. The rate of obtaining false negative results from laparoscopic biopsy was 6%.[12] Another study from the Cleveland Clinic found that four out of 30 patients required conversion to open procedure.[8] In a small retrospective study from Italy, laparoscopy was successful in providing enough samples in 94% of the 18 patients, with no conversion to open procedure. Laparoscopic lymph node biopsy would enable quick patient recovery and could also help to avoid laparotomy.[13,14]

Four of our patients who suffered from lymphoma and one patient with chronic lymphatic leukaemia were referred to the regional haemato-oncology unit for appropriate chemotherapy. The patient with metastases was referred to the palliative care team. The remaining patients with reactive lymphadenopathy and Castleman's disease were transferred back to the referring haematologist for follow-up. Castleman's disease is a non-malignant proliferation of B-lymphocytes[15] in response to over-secretion of certain cytokines such as IL-6. If there is an underlying retroviral disease, it may respond to certain antiviral agents.[16] Laparoscopic lymph node biospy should be avoided in the presence of portal hypertension, as exemplified by one of our cases where the diagnosis was only obvious at laparoscopy. The risk of biopsy should be balanced against the prognosis and potential complications. If all other investigations (including radiological biopsies) fail, open biopsy of the relevant lymph node may be considered. Laparoscopy allows access to perihepatic and perisplenic areas, and is certainly a procedure of choice when needle biopsy fails to yield an adequate tissue sample for diagnosis, or in cases where needle biopsy is not possible.[5] Where expertise is available, laparoscopic lymph node sampling for confirming the diagnosis of patients with retroperitoneal lymphadenopathy is straightforward, safe and effective, and allows for a rapid, targeted and precise diagnosis to be reached, with minimal disruption to the patient's journey.

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