

# Laparoscopic Lymph Node Biopsies: A Safe and Valuable Sampling Method for Intra-Abdominal Lymphadenopathy with a High Diagnostic Yield

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## Research Article

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### ABSTRACT

**Introduction:** Histopathological analysis of lymph nodes is mandatory for diagnosis of conditions such as lymphoma and to confirm spread of malignant disease. In cases where the node cannot be sampled percutaneously, laparoscopy is emerging as a useful tool for biopsy of deep intra-abdominal lymph nodes with reduced morbidity and mortality when compared to the previous gold standard laparotomy.

**Methods:** This series describes 15 cases of laparoscopic lymph node biopsy over a period of 6 years. It is a retrospective case note analysis for patients who had the biopsy as an individual procedure.

**Results:** 47% (n=7) procedures were for the diagnosis of malignant metastatic spread from a known primary, with 53% (n=8) for primary diagnosis. The node was taken whole in 93% cases (n=14), with a conversion rate of 13.6% (n=2) due to difficulties with access. There was one non-diagnostic result (12.5%).

**Discussion:** This series shows diagnostic rates higher than those previously published for percutaneous lymph node sampling, which has great implications of management of potential malignancy. The conversion rates in this series are similar to those previously published, showing a procedure with low morbidity but high diagnostic yield, which should be considered in the management of cases where the malignant nature of a lymph node is in question.

## INTRODUCTION

Histopathological analysis of lymph nodes is mandatory for diagnosis of conditions such as lymphoma and to confirm spread of malignant disease<sup>[1]</sup>. In cases where the lymph node is superficial, sampling of the node does not usually pose significant technical difficulty; the biopsy can often be carried out under local anesthetic. Image-guided percutaneous lymph node biopsy has provided a safe alternative method to sample deeper lymph nodes<sup>[2]</sup>. However, there are situations when image guided biopsy is not technically viable, as there is no clear passage to the lymph node via the percutaneous route due to intervening organs. When possible, the node should be excised whole, especially when lymphoma is suspected<sup>[3,4]</sup> no evidence based guidelines currently exist to suggest a method of lymph node biopsy and so it is a wholly clinician led decision made on a case-to case basis. Before the availability of radiological guided biopsy, laparotomy was the only viable option for abdominal lymph node sampling. However, the laparoscopic approach now provides a third, alternative method. Conversion from laparoscopy to laparotomy rates ranging from 0-27%<sup>[1,4-6]</sup> in the literature. There are no known absolute contra-indications to laparoscopic lymph node biopsy. Here, we present a case series of laparoscopic lymph node biopsies; to demonstrate the safety and efficacy of this approach when image guided biopsy is not feasible.

## METHODS

We retrospectively reviewed the case notes for all patients who had undergone laparoscopic lymph node biopsy for diagnosis between March 2008 and June 2014 by the same consultant laparoscopic surgeon at one institution. Patients who had undergone lymph node clearance during another operation were excluded, for example as part of a gastrectomy. Patient case notes were

reviewed for demographics, BMI, indication for biopsy, previous investigations, length of stay post procedure and complications and mortality within 30 days. The histopathological diagnosis was also recorded.

A patient was considered for laparoscopic lymph node biopsy only if:

- a) Patient did not have superficial lymph nodes amenable to biopsy,
- b) If previous attempts at biopsy had not provided a diagnosis and
- c) Image guided biopsy was not technically possible.

In total, 9371 patients underwent a biopsy for intra-abdominal lymphadenopathy. Of these, 15 were initiated laparoscopically. The initial port (12 mm) was placed peri-umbilical using an open technique. The remaining ports were placed depending on the site of the node to be sampled. The majority of cases required a further two ports. Occasionally a fourth port was used to allow the assistant to provide the necessary traction. The whole node was removed when possible.

## RESULTS

A total of 15 patients underwent laparoscopic lymph node sampling over the study period. The mean age was 44.6 years old (range 22-71). In patients where the data was recorded, (n=7) mean BMI was 27.5 (range 23-32).

The two modalities for identifying the incidence of abdominal lymphadenopathy - 73% (n=11) were identified on CT. The remainder 27%, (n=4) on MRI.

In 47% of cases, (n=7) the indication for biopsy was to assess whether lymphadenopathy seen on imaging was metastatic disease in patients known to have a primary malignancy- prostatic or cervical. Of these, none confirmed metastatic disease. For the remaining 8 patients, the procedure was carried out for primary diagnosis. Histopathological analysis of the lymph node biopsy demonstrated lymphoma in 5 (62.5%), Crohn's disease in 1 patient (12.5%), a neuroendocrine tumor in 1 patient (12.5%) and 1 non-diagnostic result (12.5%) (**Table 1**).

Indication	Proportion
Metastatic Spread diagnosis	47%
Primary Diagnosis	53%
Lymphoma	(62.5%)
Crohn's	(12.5%)
Neuroendocrine Tumour	(12.5%)
Non-diagnostic	(12.5%)

**Table 1.** Breakdown of diagnoses from lymph node biopsies.

Within the series, only 1 (6%) biopsy was non-diagnostic due to equivocal findings on histological analysis. The node in question has been diagnosed as benign due to a lack of enlargement. In 14 cases (93%), the lymph node was removed en-bloc. In the remaining case where whole node excision was not possible due to the proximity to vasculature; a sample was taken instead. Of the 14 diagnostic samples, 6 biopsies resulted in positive diagnoses and 8 samples were normal. Only one was non-diagnostic, as discussed above.

Laparoscopic biopsy was a second-line method for 4 patients. CT guided biopsy failed in 3 cases and USS guided in 1 case. For the patient in whom Crohn's was the diagnosis, a mantoux and oesophago-gastro-duodenoscopy had been carried out prior to exclude abdominal Tuberculosis, but this was the first attempt at biopsy of a lymph node.

The location of the lymph nodes is summarized in **Table 2**.

Location	Number
Para-aortic node	5
Iliac node	5
Mesenteric node	2
Porta-Hepatic node	1
Pre-sacral node	1
Lesser curvature of the stomach node	1

**Table 2.** Location of sampled lymph nodes.

There were 2 laparoscopic biopsies were converted to open procedures; one due to a fat laden retroperitoneum, creating difficulties in visualizing the node in question, In the other, the proximity of the node to the vasculature necessitated conversion to open in order to avoid potential life threatening haemorrhage whilst biopsying a para-aortic lymph node. Total of 13 (86.7%) cases were completed laparoscopically. Although not within 30 days, one of the converted patients went on to develop an incisional hernia, which was subsequently repaired. There were no complications for the procedures carried out laparoscopically. One of the patients converted to an open procedure later on developed an incisional hernia.

The median time (days) to discharge was 1 (range 0-8), with 7 (46.7%) patients being discharged on the same day. Excluding the converted cases, mean stay was 0.6 days. The mean stay for the total series was 1.27 days.

### DISCUSSION

Image-guided sampling is first line for non-superficial lymph node and so, is important to examine the patient for any superficial nodes, which could be sampled to reduce the morbidity associated with surgical biopsy of deeper nodes. Proximity to major vasculature or intervening structures, however, may render percutaneous sampling impossible, or mean that an adequately sized sample may not safely be harvested [7].

In order to make an accurate diagnosis of lymphoma, the capsule of the lymph node should also be harvested in order to facilitate histological subtyping. This bears great importance when making therapeutic and prognostic plans [8]. It was suggested that if the whole node may not be taken laparoscopically, multiple samples may be sufficient, if this is also not possible, a wedge biopsy obtaining at least 1 cm<sup>3</sup> sample should be adequate for a reliable diagnosis [3,4]. In a study comparing percutaneous to laparoscopic abdominal lymph node sampling, laparoscopic biopsy was found to yield a volume large enough to complete ancillary studies required for a definitive diagnosis [9].

Percutaneous node sampling has been shown to be a reliable, less invasive, diagnostic method done under local anesthetic with the patient going home the same day. Diagnostic rates were found to be around 75-87% [10,11]. This does, however, leave a significant proportion of cases with no diagnosis made- positive or negative. This causes a delay in diagnosis and potential treatment, as well as increasing the number of procedures a patient must undergo to achieve a diagnosis. This can also have great psychological implications for patients, which cannot be underestimated, particularly when the diagnosis in question is of a malignancy. These high non-diagnostic rates should be taken into account when planning biopsies- whether an adequate sample can be harvested percutaneously or laparoscopic sampling may actually produce a better diagnostic result.

Whereas the majority of published literature concerns the diagnosis of intra-abdominal lymphoma, in our series, the diagnosis of metastatic disease spread formed the bulk of the operative indications [9]. The accurate diagnosis of the spread of metastatic disease is key, as it dictates the treatment regime offered to patients.

False negatives must always be taken into account and when assessing results [2]. Patients should therefore always be counseled on the possibility of the false negative result when being consented for the procedure. Re-biopsy may be necessary in patients who continue to experience symptoms despite an apparently negative biopsy result.

The risk of false negative results is particularly relevant when considering lymphoma. Lymphoid hyperplasia can mimic the early stages of lymphoma, which can be diagnosed as a false negative, causing a potential delay in necessary and possibly lifesaving treatment. In the long-term follow up of the patients in our series (1-9 years), no alternative diagnoses were reached upon, nor have there been repeated attendances with the same symptoms.

Prior planning should precede any laparoscopy including comprehensive analysis of the imaging; CT or MRI to ensure the correct lymph node is sampled. All of the patients in this series were discussed in a multi-disciplinary team setting with a pathologist, radiologist, and surgeon present prior to sampling. The authors believe this to be one of the reasons contributing to the low conversion rates encountered.

Pisano et al. [5] suggested that division of the abdomen into infra and supracolic compartments, with the latter compartment being further split into 11 segments can aid planning of laparoscopic set up and route to reach lymph nodes of known position.

With conversion from laparoscopy to laparotomy rates ranging from 0-27% [1,4-6], there appears to be some variation possibly linked to pre-operative imaging review. The conversion rates of the authors (13%) and other high-powered series represent what is considered a tolerable proportion to make laparoscopic sampling an acceptable procedure [9]. The complication rate was 6% for this series, with the only complication being an incisional hernia in a case which was converted to a laparotomy, which was later repaired.

The most frequently cited reasons for conversion to open were obesity, bleeding, adhesions and technical difficulties [6]. Depending on the position of the node, sampling of intra-abdominal lymphadenopathy using a laparoscopic procedure can be technically demanding. As nodes follow the route of important vessels, we believe this procedure should only be carried out by a surgeon experienced in carrying out laparoscopic procedures.

The reduced morbidity associated with laparoscopy as compared to laparotomy can also have therapeutic benefits, as the time for wound healing before commencement of any treatment is greatly reduced. Previously, laparotomy was the gold standard, but with the development of laparoscopy, the need for such major surgery could be avoided. Though we had performed no open lymph node biopsies as compare.

Endoscopic ultrasound allows for an increase in the accuracy of diagnosis, with a non-diagnostic rate of 15% (compared to the 13-25% stated previously) and PPV 100% [4]. Laparoscopic ultrasonic probes can be used intra-operatively to prevent conversions to laparotomy, by providing improved accuracy in locating the lymph nodes in question. Casaccia et al. [1] found the

use of a laparoscopic probe with a flexible head of 7.5 MHz particularly helpful in dissection of retroperitoneal fat, especially in the obese, a noted reason for conversion to laparotomy, as mentioned above and in one of the cases in this series<sup>6</sup>. The mean disclosed BMI in this series was 27.5, which may have been the reason for our lower conversion rates, as retroperitoneal fat was not such a problem in all cases but one.

The limitations of this study are the limited number and the retrospective nature. A multi-institutional prospective study would allow greater numbers to be included in the study, increasing the statistical power, as well as combining the skills of different surgeons. A prospective study would also ensure that more data values such as BMI could be collected for every patient.

### CONCLUSION

Laparoscopic lymph node biopsy is a safe and reliable method of diagnosing inflammatory disease and metastatic spread to lymph nodes. Due to the increased volume of sample that can be retrieved when compared to percutaneous LN sampling, alongside the low conversion rates it is shown to have increased diagnostic accuracy and reduced morbidity when compared to the standard laparotomy. In the diagnosis of metastatic spread of malignancy, PET CT must not be dismissed in order to reduce any unnecessary morbidity. The efficacy of this procedure can be increased with the use of intra-operative USS- a technique the authors are keen to integrate into their working practice.

### REFERENCES

1. Asoglu O, et al. Laparoscopy for the definitive diagnosis of intra-abdominal lymphoma. *Mayo Clin Proc.* 2005;80:625-631.
2. Pisano G, et al. Laparoscopic lymph node biopsy in the diagnosis of lymphoma. Indications and results. *Ann Ital Chir.* 2012;83:469-476.
3. Bhandarkar DS, et al. Laparoscopic biopsy in patients with abdominal lymphadenopathy. *J Minim Access Surg.* 2007;3:14-18
4. Steel BL, et al. Fine needle aspiration biopsy in the diagnosis of lymphadenopathy in 1,103 patients. Role, limitations and analysis of diagnostic pitfalls. *Acta Cytol.* 1995;39:76-81.
5. Balestreri L, et al. Efficacy of CT-guided percutaneous needle biopsy in the diagnosis of malignant lymphoma at first presentation. *Clin Imaging.* 2005;29:123-127.
6. Casaccia M, et al. Laparoscopic lymph node biopsy in intra-abdominal lymphoma: High diagnostic accuracy achieved with a minimally invasive procedure. *Surg Laparosc Endosc Percutan Tech.* 2007;17:175-178.
7. VanSonnenberg E, et al. Triangulation method for percutaneous needle guidance: The angled approach to upper abdominal masses. *AJR Am J Roentgenol.* 1981;137:757-761.
8. McCarthy KP. Molecular diagnosis of lymphomas and associated diseases. *Cancer Metastasis Rev.* 1997;16:109-125.
9. Daly SC1, et al. Laparoscopy has a superior diagnostic yield than percutaneous image-guided biopsy for suspected intra-abdominal lymphoma. *Surg Endosc.* 2015;29:2496-2499.
10. Bret PM, et al. Abdominal lesions: A prospective study of clinical efficacy of percutaneous fine-needle biopsy. *Radiology.* 1986;159:345-346.
11. Diulus L, et al. Efficacy of laparoscopic mesenteric/retroperitoneal lymph node biopsy. *Surg Endosc.* 2009;23:389-393.