

## The role of laparoscopy and intraoperative ultrasound in the diagnosis and staging of lymphomas

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**SUMMARY:** The role of laparoscopy and intraoperative ultrasound in the diagnosis and staging of lymphomas.

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*Laparoscopic surgery plays today an important role in the diagnosis and staging of abdominal lymphomas; in fact it provides adequate lymph node sampling for histological typing and immunophenotyping. The mini-invasive procedure is safe and effective. Intra-operative ultrasound permits to study the parenchymal organs in addition to intra-abdominal lymph node and/or masses.*

**RIASSUNTO:** Il ruolo della laparoscopia e dell'ecografia intraoperatoria nel percorso diagnostico-stadiativo dei linfomi.

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*La chirurgia laparoscopica ha oggi un ruolo importante nella diagnosi e nella stadiazione dei linfomi a sede endoaddominale, in quanto consente di eseguire sampling linfonodali adeguati per gli studi di immunoistochimica e citogenetica, in piena sicurezza e nel rispetto dei criteri di mini-invasività che ne fanno una procedura ben accettata al paziente. Inoltre è possibile anche avvalersi di sonde ecografiche intraoperatorie che consentono lo studio e la valutazione ultrastrutturale degli organi e delle tumefazioni da asportare.*

**KEY WORDS:** Lymphomas - Laparoscopies - Biopsy - Intraoperative ultrasound.  
Linfomi - Laparoscopia - Biopsia - Ecografia intraoperatoria.

### Introduction

Lymphomas represent a neoplastic disorder whose treatment is carried out by a multidisciplinary panel including hematologist, radiologist, surgeon and pathologist. An adequate treatment is determined by a correct staging and at the end of the medical treatment is often necessary to restage the disease to better plan the best management (1,2).

The staging of lymphomas can be difficult due to the intra-abdominal site of the disease that makes fairly difficult both the biopsy and the retrieval of specimens ad-

equates for the pathological exams. Different approaches have been used so far such as open surgery, percutaneous biopsy, and lately laparoscopy assisted biopsy with associated intraoperative ultrasound (3). The latter, although still invasive, allows both to sample lymph nodes located in areas difficult to access such as the retroperitoneum, and to study the echostructure of organs often involved, such as the spleen and the liver.

### Patients and methods

From 2006 to 2008, thirty patients underwent a surgical procedure to diagnose and stage a lympho-proliferative disorder in the Division of General Surgery at the "Vittorio Emanuele" Hospital in Catania. Out of 30 patients twelve were male, and eighteen were female with an age between 29 and 54 years (median, 41 years). Twenty-five patients were operated to confirm the diagnosis and 5 were operated to evaluate the response to medical therapy.

All patients underwent a CT scan that showed suspicious lymph nodes in the retroperitoneum (8 patients), mesentery (4 patients), or in other locations in the abdominal cavity (18 patients). During surgery, the abdominal cavity was inspected for adenopathies or

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parenchymal lesions in the liver or spleen following the information gathered by both the preoperative images and the intra-operative ultrasound. Lymph nodes macroscopically abnormal were biopsied and retrieved fully. In eight out of thirty patients an involvement of the spleen was shown with the help of the intra-operative ultrasound.

## Results

The surgical intervention was completed successfully and without complications in 25 out of 30 patients (85%). In 5 out of the 8 patients with retroperitoneal lymphadenopathy (17%) the procedure was converted to an open procedure. The causes were firm adhesions in 2 patients, obesity, insufficient biopsy and bleeding in the other 3 patients. The average duration of the surgical procedure was 35 minutes for the laparoscopic cases and 80 minutes for those procedures converted to open.

Postoperatively no complications occurred. The patients that underwent a laparoscopic approach were discharged either on the first or the second postoperative day as opposed to the patients that were converted to an open approach who went home between postoperative days 3 and 6. We had no late postoperative complications.

The pathology showed Hodgkin lymphoma in 10 patients and non Hodgkins lymphoma in 20 patients. The biopsies of the spleen performed intra operatively under ultrasound guidance were positive for lymphoproliferative disease in 26 % of the cases. In all patients, the biopsies performed under ultrasound guidance allowed a thorough immunohistochemical and fenotypical analysis of the lymphoid cells.

## Discussion

In the past, due to lack of adequate imaging techniques, surgery had a prominent role in the diagnosis of lymphoproliferative disorders. It is sufficient to remember the Glatstein protocol (1969) (4), which was the stan-

dard for staging of Hodgkin's lymphomas (laparosplenectomy). Later, with the improvement of the imaging (5-7), a less invasive approach developed with an increase in the number of ultrasound or CT-guided percutaneous biopsies (6,8,9). Although this was undoubtedly a less invasive technique there were some limitations to this approach: often the biopsies were not adequate to make a correct diagnosis and staging with proper identification of the subpopulation of the neoplastic lymphoid cells. Furthermore, percutaneous biopsies were laden with risks especially when the biopsies were performed close to "delicate" areas such as the para-aortic area.

In the last 20 years, the laparoscopic approach has slowly replaced open surgery due to its efficacy, safety and minimal invasiveness (10,12). In fact, when compared to percutaneous biopsy, the laparoscopic approach is not only safer, but also more sensitive (100% vs. 87%), more specific (100% vs. 93%) and more accurate (83% vs. 33%) to stage lymphomas (13%).

The use of intra-operative ultrasound probes allows the surgeon to evaluate precisely the areas that need to be biopsied and to evaluate organs such as the liver and the spleen, which can potentially be involved by the lympho-proliferative disorder. Therefore, as already confirmed by the evidence from the literature and by our experience, a laparoscopic approach coupled with intraoperative ultrasound is a valid, safe and well tolerated method for the biopsy and staging of intra-abdominal lymph nodes (14,15).

## Conclusions

The recent advances in diagnostic imaging and mini-invasive surgery have reestablished the role of surgery in the diagnosis and staging pre and post treatment. Laparoscopic surgery with its ability to allow an adequate biopsy with minimal psychological and surgical stress proposes itself as a valid new approach in the diagnosis and staging of lymphomas.

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