

Ultrasonography in the Staging of Hodgkin's Disease: Lymphangiographic Correlation

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Abstract—The contribution of ultrasonography (US) to the staging of Hodgkin's disease was studied in 45 patients. US findings were compared with lymphangiograms (LAG) performed in the same period. In 93% of the patients there was good correlation between the two examinations. In 7% (three patients) there was a discrepancy: LAG showed retroperitoneal node involvement while with US this was negative. There were no false-positive US examinations. We therefore suggest that US be used as the primary method in the initial evaluation of Hodgkin's disease and LAG be performed only when US is negative.

INTRODUCTION

THE PROGNOSIS of Hodgkin's disease (HD) has dramatically improved during the past three decades due, in part, to greater accuracy of staging and following the course of the disease. Imaging of the lymphatic system is a crucial step in determining the proper therapeutic approach. The evaluation of deeply located, non-palpable retroperitoneal and pelvic lymph glands was formerly a diagnostic obstacle, and prior to the advent of ultrasonography (US) and computed tomography (CT) accurate staging was based on bipedal lymphangiography (LAG) [1-3] and staging laparotomy. With the introduction of the new non-invasive techniques, US and CT are used more often in evaluating possible involvement of retroperitoneal lymph nodes in HD.

The purpose of this study was to compare the contribution of US and LAG in the staging of HD.

MATERIALS AND METHODS

The files of all the patients admitted to the Hematology Clinic at the Chaim Sheba Medical Center for the initial evaluation of HD between the years of 1977 and 1982 were reviewed. Forty-five patients who underwent both bipedal LAG and US before the initiation of therapy were included in the study. Subsequently, staging laparotomy was performed in five of the patients.

US examinations were performed using static as well as linear or sector real-time scanners with 3.5-5.0 MHz. The normal lymph node is usually not demonstrated by US since it has a similar

pattern of reflections as its surroundings. Positive examinations were defined either as >2 cm enlargement of lymph nodes or the appearance of well-demarcated nodes. Focal involvement of the spleen and liver were suspected when echo-free areas were demonstrated in the organs [4]. In the few cases when technically unsatisfactory examinations were obtained, studies were repeated within days. Whenever necessary, acoustic windowing was created by filling the stomach with water. Equivocal examinations were considered as negative.

Bipedal LAG was performed and interpreted according to the system presented by Fuchs [5]. Approximately 7 ml of iodized oil were injected into the lymphatics on the dorsum of both feet at a very slow rate. Abdominal and chest X-rays were taken before the study and after the injection had been completed, as well as on the following day. The films included postero-anterior, lateral and oblique projections of the abdominal and pelvic areas, sometimes with additional linear tomography.

RESULTS

Ultrasonographic and lymphangiographic findings are shown in Table 1. In 42 patients (93%) LAG and US were in agreement: 29 (64%) of both examinations were negative and 13 (29%) positive. In eight of the above 13 positive cases, both US and LAG showed retroperitoneal lymph gland involvement; however, LAG detected more extensive disease in three of these patients. In five of the 13 positive examinations, US failed to demonstrate

Table 1. Comparative results of US and LAG in 45 patients with HD

Both US and LAG negative	29 patients (64%)
Both US and LAG positive	13 patients (29%)
Different findings US and LAG	3 patients (7%)

Table 2. Details of three patients with different results on US and LAG

Patients	LAG	US	Comment
1	Bilateral paravertebral nodes at L ₂ -L ₃ and L ₅ .	no disease in retroperitoneum and pelvis. Suspected lesions in spleen and liver	detection of splenic and hepatic involvement usually indicates the coexistence of retroperitoneal disease
2	Left paravertebral nodes, L ₁ -L ₅ . Right external iliac nodes	no disease in retroperitoneum and pelvis	(1) abdominal CT negative (2) laparotomy not performed (3) follow-up period too short to conclude whether there was abdominal disease
8	Bilateral paravertebral and iliac nodes	no disease in retroperitoneum and pelvis	(1) abdominal CT positive (2) despite treatment, the patient had an abdominal relapse 8 months after diagnosis

retroperitoneal disease, although it demonstrated pelvic or iliac node involvement, thus making the same overall contribution to the staging of the patient. In three additional patients (7%) there was a discrepancy between the lymphangiographic and sonographic findings, LAG being positive and US negative. Detailed data on these cases are presented in Table 2.

DISCUSSION

This study shows that in most of the patients with HD there was agreement between the two modalities on the presence or absence of disease in the abdominal nodes. At the same time the relative superiority of LAG was demonstrated: (a) LAG showed disease in three patients who had normal US; (b) LAG delineated more extensive lymphatic involvement in eight of the 13 cases in which both examinations were reported as abnormal. However, this study could not evaluate the comparative absolute accuracy, sensitivity and specificity of US vs LAG, because staging laparotomy was performed in only five patients since this procedure is no longer part of the initial work up of HD in our

institute. We still employ LAG as the basic method for abdominal staging in view of many previous studies which concluded that the overall accuracy of LAG compared to laparotomy in detecting retroperitoneal lymph gland involvement is more than 90% [1, 2, 6-8].

Relatively few studies have examined the contribution of US in the staging of HD. The largest series, by Brascho *et al.* [9] on 179 patients, showed that US was correct in predicting retroperitoneal disease in 87.5% of the cases. However, the study included patients with both HD and non-Hodgkin's lymphoma. Rochester *et al.* [10], in their survey of 16 lymphoma patients, reported similar results, but again they did not deal exclusively with HD. The diagnostic value of CT, US and LAG compared to staging laparotomy in 32 patients with HD and 30 patients with non-seminomatous testicular tumors was recently reported by David *et al.* [11]. They found that US gave the same correct positive information as LAG but was superior to LAG in excluding retroperitoneal nodal disease.

It should be noted that despite its accuracy and its ability to demonstrate the size, shape and

texture of the para-aortic nodes, LAG has many disadvantages. It is invasive, costly and time-consuming, and it may cause certain complications such as local pain, infection and adverse reactions to the contrast material. Although US can only assess the size of lymph nodes, it is a non-invasive, safe, quick, relatively inexpensive and easily reproducible method which also provides data on abdominal organs such as the spleen and liver [4]. Moreover, US detects abnormalities in the superior mesenteric and celiac lymph nodes which cannot be demonstrated by LAG [3]. Although it has not been shown yet that these data improve the

accuracy of the staging procedure, it is still a valuable information. Therefore, US is employed in many centers as complementary to LAG in the initial investigation of HD, in the follow-up of patients and in the monitoring of the therapeutic response.

As no false-positive US examinations were found in our series we are now considering a protocol according to which LAG should be performed only in those patients with negative US. A similar approach has already been adopted in other centers regarding the use of US [11] or CT scan [12] as the primary imaging method.

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