Open retroperitoneal lymph node dissection

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Testicular cancer has become one of the most curable solid malignancies. Although chemotherapy can rescue patients with advanced disease, accurate staging of the retroperitoneum has been a mainstay of effectiveness of treatment. Retroperitoneal lymph node dissection via open technique has been and remains the gold standard for pathologic staging of the retroperitoneum as well as effective therapy for patients with minimal nodal involvement. Retroperitoneal lymphadenectomy has resulted in a 99.5% tumor survival for patients with clinical stage I or early stage II disease.

Alternatives to open retroperitoneal lymph node dissection include laparoscopic retroperitoneal lymph node dissection, active surveillance, or primary chemotherapy. Each of these modalities has a potential role in selected patients. For the majority of patients, however, a meticulous retroperitoneal lymph node dissection gives patients the highest likelihood of survival with relatively low morbidity.

Key Words: testicular cancer, retroperitoneal lymph node dissection

Testicular cancer, with an incidence of 3/100,000 men/year, is the most frequent malignancy in males between the ages of 20 and 35. There will be an estimated 9000 new cases in 2004.[1] Dramatic changes have occurred in the management of nonseminomatous germ cell tumors of the testis in the past 23 years. Improved chemotherapy has been largely responsible for enhanced survival, but surgery remains a major factor in the overall management planning. The role of surgery is three-fold. First, radical orchiectomy establishes the diagnosis and should control the primary tumor, regardless of local tumor growth or histologic pattern. Second, a meticulous, thorough retroperitoneal lymph node dissection has consistently been the single most important factor in determining stage of disease and the need for alternate chemotherapy. In this country, retroperitoneal lymph node dissection has totally supplanted the need for radiation therapy in patients with nonseminomatous testis cancer. Third, surgery has become an integral adjunct to effective platinum-based chemotherapy in patients with advanced disease. In patients who do not achieve complete remission after chemotherapy, retroperitoneal lymphadenectomy can completely remove massive retroperitoneal disease. Furthermore, the histology derived from cytoreductive surgery provides important prognostic information and direction for the subsequent need for chemotherapy.

In spite of the advanced technology, with the development of CT scanning, tumor markers, etc., there are severe limitations to the accuracy of staging.

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These sophisticated tests are rarely wrong when positive, so that the false-positive rate is quite acceptable. However, a significant false-negative rate exists, especially for the patient with limited nodal involvement in the retroperitoneum.

Surgical removal of retroperitoneal lymph nodes has been the mainstay of treatment for clinical low-stage testis cancer, with radiation therapy, chemotherapy or both, reserved as adjuncts. Retroperitoneal lymphadenectomy (RPLND), initially described in 1902, has developed into an important staging as well as therapeutic procedure for patients with nonseminomatous testis cancer. Recently, three major centers have reported a 99.5% tumor-free survival for all patients with stage A and B disease treated since 1973 without exclusion on the basis of extent of disease.[2-4] Basic to the treatment plan at these centers has been a careful surgical staging by means of a meticulous RPLND along with the subsequent use of adjuvant chemotherapy. There is now unequivocal evidence that a meticulous RPLND effectively controls local disease with a low morbidity and a mortality rate of less than 0.1%. Furthermore, among the 387 collected patients, including some with stage B massive retroperitoneal disease, only one retroperitoneal recurrence was documented. Staubitz, in a series of patients treated with RPLND without adjunctive radiotherapy or chemotherapy, demonstrated 5 year survival rates for stage I and stage II patients of 75% with RPLND alone.[5] In Donohue's series of 1180 patients over a 34-year period, 65% of the patients with pathologically involved retroperitoneal lymph nodes were cured by retroperitoneal lymph node dissection alone with a mean operative time of 3.5 hours.[2] Thus, removal of the retroperitoneal lymph nodes can be therapeutic as well as diagnostic, and represents the gold standard to which laparoscopic RPLND must be compared.

One of the disadvantages of standard retroperitoneal lymph node dissection had to do with the morbidity of retrograde ejaculation or failure of seminal emission. Starting in the 1980's, template dissections were described avoiding the postganglionic sympathetic fibers below the inferior mesenteric artery on the contralateral side. With these techniques, approximately 95% of patients retained normal antegrade ejaculation.[6] Donohue[2] and Jewett[7] have described prospective nerve sparing approaches, resulting in preservation of ejaculation in almost 100% of patients.

For years, RPLND has been the standard form of management for men with stages I and II nonseminomatous germ cell tumors of the testis. With the development of improved techniques for clinical staging and effective chemotherapy, this concept has been challenged. Observation alone has been recommended for patients with low stage nonseminomatous germ cell tumors of the testis, based upon two major factors.[8] These include the ability to salvage young patients who relapse with effective chemotherapy and the complications of lymphadenectomy, specifically with regard to ejaculatory compromise and subsequent infertility, especially in a young patient population in whom future progeny would normally be expected. Surveillance is appropriate for low-risk patients as long as they are reliable.

The problem with surveillance is a significant relapse rate, generally between 25%-30% in all series in the literature, and a death rate of approximately 2%. Many patients have difficulty with compliance with surveillance. In a study by Hao and associates, only 60% of patients complied with clinical evaluation the first year and 35% the second year .[9] CT scan compliance was even worse with 25% in the first year and 12% in the second year. These individuals reported relapses of up to 49 months. Furthermore, later relapses can occur, necessitating long-term follow up.[10]

Stratification of patients into high-risk category, with predominant embryonal carcinoma or lymphovascular invasion, has resulted in recommendations for primary chemotherapy .[11] This approach has generally been utilized in Europe with two cycles of bleomycin, etopocide, and platinum given with a low relapse rate. Nonetheless, there is concern about over treatment of many patients, grade 4 toxicity and potential mortality from chemotherapy, long-term nephrotoxicity, pulmonary toxicity, fertility, and especially secondary leukemias related to etopocide.

Laparoscopic retroperitoneal lymph node dissection seeks to become an alternative to open retroperitoneal lymph node dissection .[12] The problem in most centers has been the lack of interaortal caval node excision for left-sided retroperitoneal lymph node dissection, a long operating time, and essentially a staging procedure. In patients who are found to have any positive nodes, two cycles of chemotherapy have been recommended.[13] Until laparoscopy can be proven to be a therapeutic procedure as well as a staging procedure, it will remain in the experimental category. Furthermore, because of the steep learning curve, only selected centers will gain the number of patients to develop expertise in laparoscopic retroperitoneal lymph node dissection.

With the development of more sensitive tests and perhaps more sensitive tumor markers to indicate the presence or absence of retroperitoneal nodal disease, RPLND may have to be re-examined in another light. However, with the lack of sensitivity of biochemical tumor markers for minimal disease and our inability to carefully assess and monitor the retroperitoneal lymph nodes, a meticulous surgical staging procedure currently allows selection of the least toxic chemotherapeutic agent or combination tailored to maximize survival of the patient with minimal morbidity. By allowing the selection of additional chemotherapy and eliminating retroperitoneal recurrence, RPLND remains the single most important factor in dictating therapeutic plans at the current time. The tumor-free survival of 99.5% for all patients with clinical stage A and B disease represents the gold standard by which any other therapy must subsequently be compared. □

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