Prescalene Lymph Node Biopsy

GEORGE E. CRUFT, CDR, MC, USN, STEPHEN J. MUCHA, LT., MC, USN,
AND HORACE D. WARDEN, CAPT., MC, USN, F.C.C.P.

Philadelphia, Pennsylvania

The accessibility of the lymph nodes overlying the scalene muscles make their biopsy a valuable diagnostic procedure in the histopathologic evaluation of intrathoracic disease. A surgical procedure which is associated with minimal patient discomfort, infrequent complications, and no reported mortality, scalene node biopsy has assumed increasing importance in the 12 years since Daniels’ first suggested this diagnostic method. Usually, sampling of these nodes may be indicated in patients with intrathoracic disease undiagnosed by other methods such as bronchoscopy, bronchoscopic biopsy, and sputum cytology, and in patients with previously diagnosed lung carcinomas as an aid in determination of resectability.

Anatomy

An understanding of the lymphatic drainage of the lung is necessary to utilize properly the procedure of scalene lymph node biopsy. Rouviere’s1 description of the lymphatic drainage of the lungs has indicated that in lesions of the right lung and lower lobe of the left lung, biopsy of the right prescalene nodes should be done. In lesions of the left upper lobe and its lingular segment, the left scalene group is sampled. Connar2 advises bilateral biopsy for the left lower and left midlung field lesions.

The prescalene lymph nodes are found in the prescalene fat pad which occupies the space, as described by Daniels, “bounded below by the subclavian vein, medially by the internal jugular vein, and laterally by the omohyoid muscle. The floor of the space is formed by the scalenus anticus muscle with the phrenic nerve lying in its sheath.” The number of lymph nodes in the prescalene fat pad specimen may vary from three to 30.

Technique

Following infiltration of the skin and subcutaneous tissues with a 0.5 per cent lidocaine (Xylocaine) solution, an incision is made parallel to, and about 2 cm. cephalad to the clavicle starting at the midpoint of the insertion of the sternocleidomastoid muscle and extending laterally 5 cm. The platysma muscle is divided. The sternocleidomastoid muscle is retracted medially. Occasionally, division of the clavicular portion of the insertion of the muscle is necessary. The inferior belly of the omohyoid muscle is retracted superiorly. The pretracheal layer of deep cervical fascia is exposed and divided. The prescalene fat pad is exposed and excised by sharp and blunt dissection. Transverse cervical vessels and thyrocervical trunk branches may need to be ligated. On the left, the thoracic duct should be identified to avoid injury. The pleural dome should also be avoided. The wound is closed in layers. Postoperatively, a chest x-ray film is obtained to verify that pneumothorax has not resulted from inadvertent entering of the pleural dome.

Purpose

The purpose of this paper is to analyze the value of scalene lymph node biopsy in this hospital where we have reviewed 62 consecutive scalene node biopsies.

<table>
<thead>
<tr>
<th>Table 1—Results of Biopsies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total biopsies</td>
</tr>
<tr>
<td>Positive</td>
</tr>
<tr>
<td>Per cent positive</td>
</tr>
</tbody>
</table>

*From the Surgical Service, U. S. Naval Hospital.
MATERIAL
Our case material comprises a study of 62 prescalene biopsies performed in 58 patients. Table 1 summarizes our results:

Our yield of 22.6 per cent positive biopsies is somewhat less than other series. Shefts, Terrill, and Swindell reported a positive yield of 35.8 per cent. Cruze and Hoffman reported 31.1 per cent positive; Numiker, DeWeese and Lawrence reported 24 per cent positive; Connar 31 per cent; Harken, Black, Clauss, and Farrand found 16.3 per cent positive in their 123 cases.

Table 2 summarizes the positive and negative pathologic reports on all our prescalene biopsies:

<table>
<thead>
<tr>
<th>Pathologic Reports of Prescalene Biopsies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metastatic carcinoma</td>
</tr>
<tr>
<td>Pulmonary sarcoidosis</td>
</tr>
<tr>
<td>Reactive hyperplasia</td>
</tr>
<tr>
<td>Normal lymph nodes</td>
</tr>
<tr>
<td>No lymph nodes in specimen</td>
</tr>
</tbody>
</table>

Of the 14 positive biopsies in our series, a histopathologic diagnosis of Boeck's sarcoid was reported in six cases. The remainder were metastatic carcinoma. This confirms the findings of others who have reported on the results of this procedure that carcinoma and sarcoid are the diseases most frequently found in these biopsies.

DISCUSSION
It is our opinion that prescalene lymph node biopsy is a procedure of very definite value. While this is a relatively simple surgical procedure, proper technique is essential. The biopsy specimens in our series in which no lymph nodes were found indicate surgical error, and we recommend that this procedure be performed only by an experienced surgeon. Shefts, et al. considered that failure to find nodes was the result of inexperience. Blair and Geer comment that factors contributing to an increased percentage of positive diagnoses include proper choice of case, selection of optional side or sides, very thorough pathologic examination, and experienced and interested surgeons. Foley, et al. have emphasized the importance of an adequate incision.

In our series there was no morbidity or mortality. The length of the procedure varied from 30 to 60 minutes.

Our indications for this diagnostic procedure are: all suspected cases of pulmonary sarcoidosis undiagnosed by other methods; other intrathoracic disease in which prescalene nodes may be involved; and as an aid in determination of resectability of known pulmonary malignant neoplasms which has been proven by other methods.

In pulmonary sarcoidosis, the positive biopsy results correlated with the presumptive x-ray diagnosis in all cases. This high positive yield indicates the value of prescalene biopsy in this disease.

In our series, 13 per cent of the patients studied were found to have metastatic invasion of the prescalene nodes from intrathoracic malignancy and were spared thoracotomy.

Currently, we are including exploration of the superior mediastinum as described by Harken et al. in conjunction with prescalene lymph node biopsy.

SUMMARY
Prescalene lymph node biopsy is a procedure of established value in the diagnosis of intrathoracic disease and in determining resectability of previously diagnosed pulmonary malignant neoplasms.

In 62 biopsies in 58 patients, 14 biopsies, or 22.6 per cent yielded abnormal lymph nodes.

No operative or postoperative complication was encountered in our series, but three biopsies were inadequately performed as they were reported to contain no lymph nodes. These procedures should be performed by experienced surgeons.

RESUMEN
La biopsia de los ganglios preescapulares es un procedimiento de valor establecido ya en el diagnóstico de enfermedades intratorácicas y para determinar la resectabilidad de los casos ya diagnosticado de afección maligna pulmonar.
En 62 biopsies en 58 enfermos, 14 biopsies o sea el 22.6 por ciento produjeron ganglios anormales.

No hubo complicacion operatoria o postoperatoria en nuestra serie pero 3 biopsies realizadas inadecuadamente no produjeron evidencia de ganglios linfáticos. Este procedimiento debe llevarse a cabo por cirujanos con experiencia.

**Résumé**

La biopsie du ganglion prészcaléenique est un procédé de valeur bien établi dans le diagnostic des affections intrathoraciques et pour déterminer la possibilité de résection d'une affection maligne pulmonaire antérieurement diagnostiquée.

Dans 62 biopsies faites sur 58 malades, 14 biopsies, soit 22,6% fournirent des ganglions anormaux.

L'auteur ne constate aucune complication opératoire ou postopératoire dans sa série, mais trois biopsies furent mal pratiquées puisqu'elles ne contenaient aucun ganglion. Ce procédé ne doit être confié qu'à des chirurgiens expérimentés.

**Zusammenfassung**

Die Biopsie der ventralen Lymphknotengruppe des M. scalenus ist eine Methode von erwiesener Wert für die Diagnose intrathorakaler Krankheiten und zur Erkennung der Operabilität zuvor festgestellter bösertiger Lungenveränderungen.

Von 62 Biopsien bei 58 Kranken ergaben 14 oder 22,6% abnorme Lymphknoten.

Es kam zu keiner operativen oder postoperatoriven Komplikation in unserer Serie, jedoch waren 3 Biopsien unzweckmäßig ausgeführt gewesen, da sich dann herausstellte, daß sie kein lymphknotenhaltiges Material lieferten. Es sollte daher dieses Verfahren von versierten Chirurgen vorgenommen werden.

**References**


**Antihypertensive Mechanisms of Salt Depletion**

The antihypertensive effects of hydrochlorothiazide are related to salt depletion which acts by an effect of oligemia on systemic pressure and by an additional mechanism that decreases peripheral vascular resistance. The induced oligemia plays an important role therapeutically because it exaggerates the hypertensive effects of drugs that reduce venous return or increase vascular capacity. Two indirect studies suggest that arteriolar contractility is not impaired by the degree of salt depletion induced by hydrochlorothiazide: (1) the relative increment of response to norepinephrine were not decreased by the diuretic; (2) after re-expansion of plasma volume by Dextran and the addition of an intravenous infusion of angiotensin II at a rate determined to return systolic and diastolic pressures to prediuretic levels during continued administration of hydrochlorothiazide, the response to norepinephrine was similar to that before the diuretic was administered.

The combined observations suggest that the antihypertensive effects of salt depletion result from the hemodynamic effects of oligemia and another action which reduces the degree of humoral or neurogenic vasoconstrictor stimulation of the arteriolar bed.