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SUPERIOR SULCUS TUMOR THERAPY

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Curative manafement of apical lung tumors with chest wall involvement (superior sulcus tumors) had failed until the seminal paper by Shaw and Paulson described the now classical approach with en-bloc resection of the lung, upper chest wall and T1 nerve root. Preoperative radiotherapy (3000 rads in three weeks) was used as part of therapy. Until recently, the Shaw-Paulson technique-preoperative radiotherapy followed by en-bloc surgical resection using a posterior approach has been the standard treatment. In the past 15 years. this "standard" approach has been questioned-surgeons have utilized a variety of surgical techniques and adjuvant therapies.

In managing superior sulcus tumors. the surgeon requires an extensive knowledge of the anatomy of the "superior sulcus" and lower neck. The commonest technical problem encountered is involvement of the lower trunk of the brachial plexus. In almost all instances, unless there is clinical evidence of C-8 nerve involvement, this latter nerve root can be preserved excising only the T-1 root. On occasion, splitting the C-8 and T-1 nerve roots along the lowest trunk is necessary to accomplish this. If a rib or transverse process is eroded, the en-bloc excision must include not only the rib but the complete transverse process at its attachment to the body of the vertebra. When the anterior longitudinal ligament is involved, the cortex of the underlying vertebral body should be removed as well.

Evidence of a Horner's syndrome use to indicate inoperability. However, nore recently, complete resections have been accomplished, often using an anterior approach and requiring a resection and reconstruction of the subclavian artery.

SURGİCAL APPROACHES

Despite the introduction of a variety of approaches to deal with apical tumors, the oncologic precepts of en-bloc resection of involved adjacent structures combined with lobectomy have stood the test of time.

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The Shaw-Paulson Posterior Approach

This approach is still the preferred one when dealing with posterior placed apical tumors involving ribs and/or vertebrae.

In this technique, a generous posterolateral thoracotomy is used although the original description placed the patient in the prone position and a pure posterior thoracotomy was employed. The resection includes en-bloc removal of the upper two to four ribs with or without transverse processes, the involved root (s) of the lower brachial plexus (usually T1) and an upper lobectomy. Depending on the amount of chest wall removed, reconstruction with a plastic prostheses may or may not be necessary.

The Dartevelle Anterior Approach

This approach is best used for anterior placed tumors suspected or proven to involve the subclavian vessels. In nost instances, there is minimal if any involvement of the vertebral body or rib. When these latter structures are involved, frequently a combined anterior and posterior approach is required. With this technique, an oblique sternomastoid incision hooks transversely along the ipsilateral clavicle in order to excise the medial half of the clavicle and expose the underlying the jugular and subclavian veins. These are divided to expose the subclavian artery and brachial plexus. En-bloc resections of the involved structures and upper lobe can be accomplished after removing the first rib. No reconstruction of the rib cage is required unless two or more anterior segments of the upper ribs are excised. Variations of this approach include resection of the lateral 1/3 of manubrium together with the medial half of the clavicle. In such cases a soft patch is required for reconstruction.

Hemi-clamshell Approach

A standard hemi-clamshell incision is used in conjunction with a sternomastoid incision. The sternotomy is carried down to the third interspace before completing the anterior thoracotomy. With this approach, the clavicle need not be resected to expose the underlying vessels. As with the Dartevelle technique, when there is significant vertebral or posterior rib involvement, a combined approach may be required.

The Hook Incision

This variation includes a posterolateral thoracotomy, carrying the incision anterosuperiorly through the lower axilla and into the upper anterior chest overlying the third or fourth interspace. Although infrequently used in North America, this technique allows better proximal

control of vascular structures than the Shaw-Paulson approach by adding the anterior thoracotomy extension.

ADJUVANT THERAPİES

Following the lead of Shaw and Paulson, the standard treatment for apical tumors involving the chest wall includes preoperative radiotherapy (3000-4500 cGy over 3-4 weeks). Recent reports have questioned the necessity for preoperative treatment although no one has abandoned using radiotherapy as part of the treatment plan. Many surgeons prefer to primarily resect the apical tumor, employing the radiotherapy postoperatively. Others are examining postoperative high-dose chemoradiotherapy following primary resection. With the advent of newer preoperative therapies, both induction chemotherapy and chemoradiotherapy prior to surgical resection are being tested as another option in managing these tumors.

It appears that with complete resection, 40-60% of such tumors can be cured. Important in management is proper selection of patients. The value of surgical resection in the management of clinical T4 tumors (significant brachial plexus or subclavian artery involvement, dural involvement, vertebral destruction, etc) remains a question yet to be answered.