Ambulatory mediastinal biopsy for hematologic malignancies

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Abstract

Objective: We retrospectively evaluated our experience with outpatient surgical biopsy of mediastinal lesions in patients with hematologic malignancies, its cost-effectiveness and ability to allow diagnosis. Methods: Eighty patients underwent outpatient surgical biopsy of mediastinal lesions related to hematologic malignancies (50 cervical mediastinoscopies, 24 anterior mediastinotomies and six video-assisted thoracoscopies). Eight patients had a superior vena cava syndrome, five had lesions residuing or relapsing after chemo-radiotherapy and six had been treated with steroids before diagnosis; in five cases the biopsy had been previously performed at other hospitals without achieving a positive diagnosis. Results: Ambulatory mediastinal biopsy allowed diagnosis in all cases. Fifty-one patients had Hodgkin disease, 28 had non-Hodgkin lymphoma and one had chronic lymphatic leukemia. There was no operative mortality. Complications were: pneumothorax and bleeding during mediastinoscopy and wound infection after anterior mediastinotomy. Conclusions: Mediastinal biopsy can be safely performed on an outpatient basis in selected patients with mediastinal involvement due to hematologic malignancies. Costs were markedly reduced with respect to in-hospital procedures. © 1997 Elsevier Science B.V.

Keywords: Ambulatory biopsy; Hematologic malignancy; Mediastinal lymphoma

1. Introduction

Hematologic malignancies can involve the mediastinal lymph nodes in 40% of patients [6]. This clinical presentation often requires a surgical approach to obtain a positive tissue specimen. In fact, in our opinion, fine needle aspiration biopsy presents a risk not insignificant if weighted against the difficulty to obtain sufficient material for histological and immunohistochemical studies, which can be confidentially performed, in our view, only on biopsy specimens [12]. We consider mediastinoscopy, anterior mediastinotomy and video-assisted thoracoscopy (VAT) more adequate to reach enlarged lymph nodes in the anterior, middle and posterior mediastinum, with a low surgical trauma, a short operative time and the possibility to perform multiple biopsies of the lesion. The low invasiveness of these procedures [3,8,13] and their low rate of complications allowed us to perform them on an outpatient basis in selected cases, achieving the diagnosis earlier and reducing costs and patient’s discomfort.

2. Patients and methods

From January 1990 to December 1993, 80 patients (age between 10 and 79 years—mean 34; 43 females and 37 males) underwent surgical biopsy of enlarged mediastinal lymph nodes due to hematologic malignancies. If enlarged lymph nodes were present both in the chest and the abdomen, a biopsy of the mediastinal lesion was preferred. Patients undergoing mediastinal biopsy for other diseases (lung cancer, sarcoidosis etc.)
were not included in this retrospective study. In all cases informed consent was obtained and a family member or friend was available to transport the patient from the hospital and spend with him the first night after the operation.

Bronchoscopy, transbronchial and transthoracic needle aspiration were performed before surgery, when indicated, but a positive diagnosis was not obtained in this group of patients. The selection of patients for outpatient mediastinal biopsy was performed by the surgeon and the hematologist according to the clinical status and to baseline investigations (Pulmonary function tests, EKG, blood tests); chest X-ray, computed tomography and magnetic resonance (when indicated) allowed the exact localization of the lesion. The surgical risk for each patient was evaluated according to the American Society for Anesthesia (ASA) classification. Patients with major cardiopulmonary or systemic disorders were generally not accepted for outpatient procedures. As a rule, only ASA I (normal healthy patients) and II (mild systemic disease: diabetes mellitus, controlled hypertension, anemia, chronic bronchitis, obesity) patients were accepted; nevertheless, nine ASA III (patients with severe systemic disease that limits activity: angina pectoris, COPD, prior myocardial infarction) patients were included since their extensive lesion could be easily reached by mediastinoscopy or anterior mediastinotomy and the outpatient procedure was expressively required by the patient.

Patients were admitted in the outpatient surgical unit the morning of the operation; surgery was performed in the standard thoracic surgery operatory rooms with standard monitoring and personnel and equipment available for immediate sternotomy or thoracotomy. According to the location and extension of the lesion, mediastinoscopy, anterior mediastinotomy or VAT were planned; mediastinoscopy was performed under general endotracheal anesthesia to biopsy lesions within the peritracheal space; anterior mediastinotomy and VAT were performed under local anesthesia (2% Xylocaine) with deep sedation in spontaneous breathing (Propofol 3–6 mg/kg per h, Fentanyl 100 µg, Droperidol 5 mg and Diazepam 5 mg; 50% Venti Mask); the former was considered to reach lesions in the anterior mediastinum and infiltrating the chest wall or severely compressing the trachea and main bronchi, in order to avoid airway collapse after myorelaxation. VAT was considered to reach lesions in the anterior, middle and posterior mediastinum abutting the mediastinal pleura, for multiple lesions, or in case of restaging, to biopsy areas far away from the previous biopsy site. The surgical technique of cervical mediastinoscopy, anterior mediastinotomy and VAT were standard as reported elsewhere [4,7,8]. After VAT a chest drainage was routinely left in place to allow complete lung reexpansion. After the operation patients recovered under observation in the outpatient unit; in the evening, after the chest X-ray, blood cell count and EKG, the chest tube was withdrawn and the patient was discharged. We performed 50 cervical mediastinoscopies, 24 anterior mediastinotomies and six VATs. Eight patients (5 mediastinoscopies and 3 anterior mediastinotomies) had a Superior Vena Cava (SVC) syndrome; five presented mediastinal lesions residuing or recurring after chemoradiotherapy for non-Hodgkin lymphoma (NHL) and needed restaging (4 VAT, 1 mediastinoscopy); six had been treated with steroids before diagnosis, resulting in a shrinkage of the lesion with peripheral fibrosis (3 VAT, 3 mediastinoscopies, 1 anterior mediastinotomy); 5 patients had already been biopsied at other hospitals without obtaining a diagnosis (4 mediastinoscopies, 1 anterior mediastinotomy; previous approach: anterior mediastinotomy in all cases).

We always performed multiple biopsies waiting for frozen sections before anesthesia was discontinued.

In all patients a bone marrow biopsy was performed during anesthesia and in one case also a sternal biopsy was carried out (osteolysis); 5 patients required pericardiocentesis to improve their cardiac performance before proceeding to mediastinoscopy.

3. Results

These 80 procedures represent 48% of the total number of mediastinal biopsies performed at our center during this period. Other patients with hematologic malignancies underwent mediastinal biopsy but they were hospitalized since either their clinical status required careful postoperative monitoring or they lived far from the hospital, or they were already in the hospital at the time of surgical consultation.

A diagnosis was achieved in all patients (Table 1).

In 1 patient we opened the right mediastinal pleura during mediastinoscopy and the pneumothorax was drained with a chest tube inserted through the surgical incision; the patient was hospitalized and the chest tube was removed 24 h later. Bleeding from a tear in the right bronchial artery (350 ml of blood) occurred during biopsy of the right hilar nodes at mediastinoscopy;

<table>
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<tr>
<th>Table 1</th>
<th>Histology in patients with hematologic malignancies of the mediastinum undergoing ambulatory biopsy</th>
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<tbody>
<tr>
<td>HD</td>
<td>NHL</td>
</tr>
<tr>
<td>--------</td>
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</tr>
<tr>
<td>Mediastinoscopy</td>
<td>34</td>
</tr>
<tr>
<td>Anterior mediastinotomy</td>
<td>13</td>
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<tr>
<td>VAT</td>
<td>4</td>
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<tr>
<td>Total</td>
<td>51</td>
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<td>HD, Hodgkin disease; NHL, non-Hodgkin lymphoma; CCL, chronic lymphatic leukemia.</td>
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a drainage was left in place and the patient was discharged the day after the operation. Infection of the surgical incision (anterior mediastinotomy) occurred in one case, but no hospitalization was required. No complications occurred after VAT. Thus, only 2 patients were admitted to the regular ward after mediastinoscopy (4%) and no one after the other types of procedure (2.5% of the series). Patients were seen on a weekly basis in the outpatient clinic for 1 month. No delayed complications occurred. All patients underwent medical treatment as soon as the diagnosis was available, without any delay due to surgery.

4. Discussion

The introduction of VAT and a more aggressive diagnostic attitude of the hematologists contributed to widen the indications to thoracic biopsies. On the other hand, in the last 5 years we have been forced to face the progressive shortage of hospital beds with a consequent longer waiting list for elective operations. For these reasons we tend to hospitalize only patients requiring major thoracic operations; in case of simple biopsies outpatient procedures are preferred, unless the compromised clinical status requires a strict pre and/or postoperative monitoring. Cervical mediastinoscopy and anterior mediastinotomy are procedures at relatively low risk, with an overall complication rate ranging between 0.6 and 3% [1,3,5,6,9]. VAT has recently been advocated for the diagnosis of mediastinal and pulmonary lesions [7,11]. The operative time is short, pain is minimal and patients are able to walk and rescue basic home activities a few hours after the operation. For these reasons, ambulatory procedures are indicated for patients in good general conditions, without major cardiopulmonary or systemic disorders. We define ambulatory surgery as those patients admitted and discharged on the day of surgery; others may refer to those as outpatient surgery or same day surgery. Extensive reports of outpatient mediastinal biopsy in patients with lung cancer and sarcoidosis are already available in the literature [2,10,14,15]; for this reason we did not include these subsets in our retrospective study.

Patients with lymphoma often present huge lesions, engulfing, dislocating, compressing, shrinking or infiltrating the vessels, the airway and the esophagus; the anatomy of the mediastinum may be distorted, jeopardizing the dissection, specially at mediastinoscopy. Restaging after chemo-radiotherapy, as well as preoperative administration of steroids may add further difficulties for the presence of fibrosis and shrinkage of the tumor: the dissection could be difficult and multiple biopsies should be taken going deep into the lesion until a positive diagnosis on frozen sections is achieved. VAT could be indicated, when feasible, to reach different sites of the lesion. If an unsuccessful biopsy was already performed, a second biopsy should be carried out by a different surgical route, to avoid falling into an obliterated and fibrotic space. In the presence of bulky lesions, general anesthesia with myorelaxation may pose serious problems [12]; for this reason we prefer to perform, when feasible, anterior mediastinotomy under local anesthesia. These aspects contribute to differentiate these patients from the group with lung cancer and may explain why extensive reports on ambulatory procedures in this subset have not yet appeared in the literature.

The accurate selection of patients and the choice of the most appropriate surgical approach contribute to reduce the rate of complications. We consider anterior mediastinotomy the technique of choice for lesions located in the anterior mediastinum and infiltrating the chest wall; in this situation the biopsy can be performed under local anesthesia, without resecting the costal cartilage or opening the pleural cavity. This procedure is also indicated when large tumors of the anterior mediastinum compress the trachea and main bronchi, to avoid airway collapse after myorelaxation. VAT is indicated for lesions of the anterior, middle and posterior mediastinum abutting the mediastinal pleura and for multiple lesions. Mediastinoscopy is indicated when the lesion is within the peritracheal space. In case of restaging we prefer to perform VAT, when feasible, since it is possible to sample different areas of the lesion, far away from the previous biopsy site where fibrosis may engulf the possible recurrence.

Complications may be life-threatening and require immediate surgical exploration; back-up facilities for major thoracic procedures are required and performance outside the hospital is contraindicated.

The cost-benefit issue of this approach is evident: the outpatient unit costs 300 000 Italian lire per day with a 1 day stay while the standard thoracic surgery ward costs 800 000 Italian lire per day with at least a 3–5 day stay; the costs of the operatory room and the surgical team are the same. Preoperative workup is generally the same for both in and outpatients but it is obviously less expensive in the second group. Patients admitted to the hospital are generally more critical and they require accurate monitoring in the postoperative period. There is also a tendency in hospitalized patients to perform more radiologic and laboratory tests then required by the clinical status.

In conclusion, we actually consider outpatient mediastinal biopsy feasible for patients in good general conditions; it should be performed only if equipment and personnel for thoracotomy or sternotomy are immediately available. Inpatient procedures are indicated for those with severe cardiopulmonary disorders, those who are already hospitalized or lack adequate medical or family support or live far away from the hospital.
References