Outcome of Mediastinal Lymph Node Biopsy
By Cervical Mediastinoscopy

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ABSTRACT

Objective To analyze the outcome of mediastinal lymph node biopsy by conventional mediastinoscopy for diagnostic purpose in patients with mediastinal lymph node enlargement.

Study design Descriptive case series.

Place & Duration of study The study was conducted at 2 private hospitals of Karachi, from July 2012 to June 2014.

Methodology Patients aged 12 year and above, of either sex, who presented with CT-proven mediastinal lymph node enlargement in whom diagnosis could not be confirmed via other investigations, were included. Patients underwent conventional mediastinoscopy under general anesthesia. Patients with previous history of thyroid or neck surgery, severe superior vena caval syndrome (SVC) or cervical spondylosis were excluded from the study. Multiple lymph node stations were biopsied and sent for histopathology. Biopsy reports were followed and results analyzed.

Results Out of 32 patients 19 were males and 13 females. Age range was from 25 to 55 year. The most common diagnosis was tuberculosis. The mean duration of the procedure was 40 minutes. Lymph node stations 2 and 4 were most commonly biopsied and an average of 4 biopsy samples were obtained per patient.

Conclusion Mediastinoscopy is an invaluable and relatively cost effective procedure in the diagnosis of patients with mediastinal lymph node enlargement in whom the diagnosis could not be confirmed by other investigations.

Key words Mediastinoscopy, Mediastinal lymphadenopathy, Mediastinal lymph node biopsy.

INTRODUCTION:
The mediastinum is the area between the sternum, spinal column and the lungs. It contains the heart, large blood vessels, trachea, esophagus, and connective tissue. The diagnosis and staging of mediastinal diseases often require a tissue sample from lymph nodes adjacent to the tracheobronchial tree. The diagnostic approach of mediastinal masses keeps evolving as new imaging techniques and surgical modalities become available.

Mediastinal lymph node biopsy is now being performed using endobronchial ultrasound (EBUS). In our set up, however, expensive installation process limits the widespread use of such techniques. Conventional mediastinoscopy allows access to the mediastinum and permits the surgeon to visualize lesion with the naked eye. It is especially useful in the diagnosis of patients who present with mediastinal lymph node enlargement, not accessible by CT or ultrasound guidance. It is integral in the evaluation and staging of patients with lung cancer, tuberculosis, sarcoidosis, lymphoma and metastatic diseases where other modalities fail to fetch the diagnosis.

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The aim of our study was to evaluate the diagnostic value of conventional mediastinoscopy in patients with mediastinal lymph node enlargement in whom diagnosis by other investigations was not possible.

**METHODOLOGY:**
We prospectively evaluated all cases of CT-proven mediastinal lymphadenopathy who underwent mediastinoscopy for diagnostic purposes between July 2012- June 2014 at 2 private hospitals of Karachi. A performa was designed and patients' related parameters were recorded accordingly. Detailed history and examination was done. In all the patients CT or ultrasound guided biopsy was not possible. In all these patients, other investigative modalities had failed to ascertain the diagnosis. Other investigations done included, sputum studies and chest x-ray. Patients with coagulation profile abnormalities, severe SVC syndrome, cervical spondylosis or a previous history of thyroid or neck surgery were excluded.

All procedures were done under general anesthesia. A 4 cm cervical incision was made above the supraclavicular notch. Skin and subcutaneous tissue were dissected. Strap muscles raphe was opened and retracted. Trachea was identified and pretracheal fascia opened. After separating the adhesions between pretracheal fascia and trachea, mediastinoscope was gently introduced. The mediastinum was carefully surveyed and mediastinal lymph nodes identified. Biopsies were taken from pretracheal, paratracheal or subcarinal lymph node stations. Hemostasis was secured and wound closed in layers. The specimens were sent for histopathology and AFB culture. All patients were seen at follow up on 5 day and then at 2 weeks with biopsy report to plan further management. Data was presented as simple percentages for categorical variables.

**RESULTS:**
A total of 32 patients underwent mediastinoscopy. Patients presented mostly with either non productive cough, fever, SOB, chest pain or weight loss. There were 19 (59.4%) males and 13 (40.6%) females. All patients were between 25-55 year of age with a mean age of 41 year. This included 7 (21.8%) patients between 26-30 year, 03 (9.3%) between 31-35 year, 06 (18.7%) in the 36-40 year, 10 (31.2%) between 40-45 year and rest (n=6) older than 45 year. The procedure lasted between 35-45 minutes with an average procedure time of 40 minutes. Lymph node stations 2 and 4 were most commonly biopsied and an average of 4 biopsy samples were obtained per patient (range 1-8).

The most common diagnosis after mediastinoscopy and histopathological confirmation was tuberculosis in 14 (43.7%) cases. Nine (28.1%) patients had lymphoma, 04 (12.5%) with metastatic lymph node enlargement from primary lung cancer, 02 (6.25%) had metastatic lymph node enlargement due to secondary malignancy elsewhere in the body while 03 (9.3%) patients were diagnosed as having sarcoidosis.

**DISCUSSION:**
Mediastinoscopy is a useful procedure in the diagnosis of mediastinal lymphadenopathy and masses particularly when other investigations fail to yield diagnostic confirmation. The technique was first described by Carlens in 1959. Since then it has been widely practiced in suspected cases of tuberculosis, sarcoidosis, lymphoma and lung cancer staging.

| Table I: Comparison of Our Study with Histopathological Results with other Studies |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Number of patients                            | 32                                            | 100                                          | 398                                          |
| Tuberculosis                                  | 14                                            | -                                            | 16                                           |
| Sarcoidosis                                   | 3                                             | 8                                            | 191                                          |
| Lymphoma                                      | 9                                             | 6                                            | 17                                           |
| Lymph node enlargement due to primary lung carcinoma | 4                                             | 74                                           | 99                                           |
| Lymph node enlargement due to metastasis from malignancy elsewhere | 2                                             | 2                                            | 20                                           |
Conventional mediastinoscopy allows clear visualization of mediastinal lymph node stations 2, 3, 4 and 7 which are the upper paratracheal, prevascular, lower paratracheal and subcarinal stations respectively. In our study, stations 2 and 4 were biopsied most frequently and a mean number of 4 samples were taken for biopsy per patient. Multiple previous studies on mediastinoscopy reflected similar sampling size and mean number of stations sampled. Karlis et al mean number of lymph nodes sampled was 1.9 (range 1-4), Cho et al mean number of lymph node biopsy sample was 7 ± 4.88 and total number of stations biopsied was 2.98 ± 0.71. 

Anraku et al total number of lymph nodes sampled was 5 ± 2.8 and mean number of stations biopsied was 2.6 ± 1.1. The average operating time in our study was 40 minutes. In a study conducted by Mehmet et al the average procedure time was 26.4 minutes. Martin et al reported that the average operative time was 29 minutes with range of 18-51 minutes.

Irene J et al described mediastinoscopy as a single-day outpatient procedure with no overnight hospitalization. In our study all patients were admitted in the hospital for monitoring and management for any postoperative complication and discharged after 24 hours. Although conventional mediastinoscopy is considered a minimally invasive procedure, the mediastinal area is a sensitive one, being close to major vessels, nerves and airway, hence the procedure is not without any hazard. Per and postoperative mortality rates are generally reported as between 0.9 and 4.5% with the number of complications increasing in inexperienced hands. In our study there was no mortality. Perioperative profuse bleeding, postoperative pneumothorax, wound infection, damage to the recurrent laryngeal nerve are some of the common complications reported. Esophageal perforation, thoracic duct injury, phrenic nerve paralysis are other possible complications. In our study, two out of 32 patients developed postoperative wound infection which were treated with antibiotics. One patient developed pneumothorax which was managed by tube thoracostomy. Table I shows comparative results of mediastinoscopy of our study with that of reported series.

The procedure is not entirely devoid of merits. Mediastinoscopy patients do not require one-lung anesthesia and there is no need of tube thoracostomy as a routine part of the procedure. Our study was limited by a small sample size with a heterogeneous group of patients. We sampled mediastinal lymph node stations 2, 3, 4 and 7 only. We did not perform video-assisted mediastinoscopy or VATS which might be superior to the conventional method.

CONCLUSIONS: Mediastinoscopy is a useful diagnostic tool. It is cost effective procedure for the diagnosis of diseases in patients with mediastinal lymph node enlargement in whom the diagnosis could not be confirmed by other investigations.

REFERENCES:


