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Cervical mediastinoscopy in the Netherlands: past or present? A retrospective analysis of 218 procedures

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ABSTRACT

Background: Cervical mediastinoscopy (CM) has been considered the gold standard for the evaluation of mediastinal lymph nodes in the staging of non-small cell lung cancer (NSCLC) for many years. Recent publications on the value of PET scanning might reduce the use of CM in the near future. The aim of this study was to analyse the data of our CM procedures for their reliability and contribution in the assessment of mediastinal lymph nodes.

Methods: In the period 1995-1999, 219 patients underwent CM. Data were available on 218 procedures and were analysed retrospectively. CM was performed in 162 men and 56 women with a median age of 56 years [range 29 to 80 years].

Results: Median hospitalisation time was three days. There was no mortality and morbidity was 6%. In 96% of procedures representative lymphoid tissue was obtained. In 24%, biopsies contained malignancy.

Conclusions: CM is a relatively safe procedure with a high diagnostic yield. As long as PET scanning remains available at a limited level, CM remains the gold standard in the Netherlands for patients with apparently operable NSCLC.

INTRODUCTION

Cervical mediastinoscopy (CM) has been considered the gold standard for the evaluation of mediastinal lymph nodes in the staging of non-small cell lung cancer (NSCLC) for several decades. Furthermore, CM is useful to obtain histological samples in cases of primary mediastinal lymph node enlargement. Relative disadvantages of the procedure are its invasive character and the need for general anaesthesia. Recent studies on the value of PET scanning[1-3] have demonstrated that reliable preoperative staging may be performed without CM in selected patients. It seems reasonable to expect a reduced need for CM in the very near future, although it will remain indicated in a considerable number of patients. In this retrospective study, data from 218 CM procedures were analysed for their reliability and contribution in the assessment of mediastinal lymph nodes.

PATIENTS AND METHODS

In the period 1995 to 1999, 219 CMs were performed in Medisch Spectrum Twente, a large community hospital in the Netherlands (1995: 49; 1996: 45; 1997: 42; 1998: 50; 1999: 33). The same procedure was performed as was described several decades ago.[4] Data could be retrieved for 218 procedures (99.5%) and were analysed retrospectively. Patient characteristics are depicted in *table 1*. The majority of patients (n=212; 97%) were referred from the Department of Pulmonology. The others were referred from the Departments of Internal Medicine (2) and Neurology (2) and from other hospitals (2). In 202 cases (93%) there was apparent pulmonary malignancy and in 16 cases (7%) primary mediastinal pathology. During the study period CM was mandatory prior to any thoracotomy for pulmonary malignancy. No patients had had CM or other mediastinal surgery previously.

Table 1
Characteristics of 218 patients undergoing cervical mediastinoscopy in the period 1995 to 1999

Male/female		162/56 (74/26%)
Median	Age	65 years
	Range	29-80 years
Percentage smokers*		72
Percentage COPD patients		31
Percentage smoking COPD patients		67

* *Smoking defined as active smoking or not stopped less than ten years prior to mediastinoscopy.*

Table 2
Indications for cervical mediastinoscopy as a result of the final diagnosis

Pulmonary				
Malignancy		187		86%
Primary	Squamous		97	
	Adenocarcinoma		48	
	Undifferentiated large cell		21	
	Small cell		9	
	Mixed type		3	
	Bronchoalveolar		1	
	Carcinoid		1	
	CIS (carcinoma in situ)		1	
Metastasis			6	
No classifying diagnosis		11		5%
Unknown		9		4%
Benign diseases		7		3%
Tuberculosis			6	
Sarcoidosis			1	
Other malignancies		4		2%
Non-Hodgkin			1	
Hodgkin			1	
Thymoma			1	
B cell			1	

RESULTS

The final diagnosis after CM and thoracotomy is depicted in *table 2*. The results of CT scanning are depicted in *table 3*. Histology from Naruke stations 7 (subcarinal), 4R and 4L (right and left tracheobronchial angle, respectively) was obtained in 79% (154/195), 86% (171/198) and 66% (130/196), respectively. The combinations 7/4R, 7/4L and 7/4R/4L were biopsied in 68% (133/195), 57% (112/195) and 50% (98/195) of cases. The primary lung lesion was located 1.3 times more often in the right lung. Biopsies contained representative lymphoid tissue in 96% of the cases (193/201). Of 201 procedures, 51 (24%) contained malignant tissue in at least one station biopsied. There was no difference in malignancy yield whether all three stations were biopsied or not: 24% (23/98) and 26% (23/90), respectively. Of 60 patients who had enlarged mediastinal lymph nodes (i.e. >10 mm in the shortest diameter) as diagnosed on CT, 24 (42%) had malignant lymphoid tissue on CM. Of 21 patients without enlarged mediastinal lymph nodes on CT, four (19%) had malignant lymphoid tissue. Of 38 peripherally localised squamous cell carcinomas, four (12%) had mediastinal metastases proven by CM. Median hospitalisation time was three days, including day of admission and discharge. Significant morbidity occurred after 6% of the procedures (*table 4*). There was no mortality. Subsequent thoracotomy was performed in 145 patients (67%): 4 wedge resections (3%), 67 lobectomies (46%), 11 bi-lobectomies (8%), 49 pneumonectomies (34%) and 14 explorative thoracotomies (10%). In 73 cases (33%) CM was the final procedure. In 58, biopsy results excluded patients from thoracotomy: malignancy (n=51), benign disease (n=7). In two cases, thoracotomy was not performed due to complications related to CM: one patient developed congestive heart failure and one needed mechanical ventilation for several days after CM.

Table 3
CT scanning in 218 patients undergoing cervical mediastinoscopy

CT performed?	Unknown	15			
	Known	203			
	Performed		154	-	76%*
	Not performed		49	-	24%
Lymph nodes identified?	Unknown	4			
	Known	150			
	Identified		82	-	55%
	Not identified		68	-	45%
Identified lymph nodes enlarged?	Unknown	1			
	Known	81			
	Enlarged		60	-	74%
	Not enlarged		21	-	26%

* *59% (1995), 63% (1996), 74% (1997), 80% (1998), 79% (1999), respectively.*

DISCUSSION

The optimal strategy for evaluation of the mediastinum in patients with apparently operable lung cancer is still a matter of debate.[5,6] Some authors regard CM a safe procedure yielding essential information for proper staging. Therefore, it should precede any thoracotomy for NSCLC.[6-8] With CM included in the preoperative staging procedure, percentages of explorative thoracotomies without resection (so-called 'futile thoracotomies') decrease to levels less than 5%[8] and resection ratios increase from 0.60 to 0.94.[9] Others have suggested refraining from CM in patients with mediastinal lymph nodes less than 1 cm on CT scan.[5] Although CT is noninvasive and relatively simple to perform, it has clear limitations. Confirmation and exclusion of mediastinal lymph node metastases has shown to be not reliable and, therefore, not advocated as decisive in the assessment of mediastinal lymph nodes on a large scale.[1,10] Moreover, it has been shown that CM is still obligatory in tumours and patients with certain characteristics even in the absence of enlarged lymph nodes on CT.[10,11] In general, CM is considered essential in the preoperative staging of NSCLC, except for small (<3 cm) peripheral squamous cell tumours.[12]

Recent publications regarding the role of PET scanning in the staging of NSCLC are promising.[1-3,13] There is a large body of evidence showing the superiority of PET over CT for staging of NSCLC in the mediastinum.[14] Moreover, the combination of both procedures is more accurate than either procedure alone.[14] The combination of CT and PET scanning may, therefore, reduce the need for CM. Two aspects of preoperative staging are improved by the use of PET scanning. First, its negative predictive value of mediastinal involvement is sufficiently high to allow CM to be omitted. Second, detection of unexpected distant metastases may make CM redundant. However, it seems unlikely that the introduction of PET scanning on a large scale will totally replace CM. First, because PET-positive mediastinal locations will still need histological confirmation. And, furthermore, because PET's negative predictive value of mediastinal involvement is not high enough in cases of primary tumours directly adjacent to the mediastinum (i.e. central tumours).

We reviewed our results of CM and confirmed that CM is a relatively safe procedure with a high diagnostic yield, irrespective of the localisation of the primary tumour. The surgical complication risk (2.8%) was comparable with the literature: in two large studies (2259 CMs) there was a cumulative morbidity of 2%.[7,15] When the medical complications are included, a 6% complication rate still seems acceptably low. Even indirect information is provided by CM on whether patients are suitable to undergo subsequent thoracotomy: in our series two patients developed serious medical complications rendering them unfit for further surgical therapy.

A malignancy yield of 24% in our series seems adequate from a historical point of view: Tantua found 32% in 1973,[4] Luke *et al.* 30% in the period 1979 to 1984[7] and Coughlin and co-workers 27% in the period 1975 to 1983.[15] In recent publications malignancy yields are often unclear.[5,10] Inoue found 10.8%, but studied small cell lung cancer only.[16] We demonstrated a higher histological yield at the right tracheobronchial angle (4R) as compared with the left (4L). This may be explained by the fact that the primary tumour was more often located in the right lung. Another explanation may be better accessibility of the right tracheobronchial angle.[4]

In our series, only half the patients were biopsied in all three accessible stations. Although this seems rather low, this observation has been made before.[17] No differences were found in diagnostic yield between cases in which biopsies were taken from all three stations as compared with

Table 4
Morbidity in 218 patients undergoing cervical mediastinoscopy in the period 1995 to 1999

		NUMBER	%
Surgical		6	2.8
	Recurrent nerve palsy	3	1.4
	Significant drop in haemoglobin level	2	0.9
	Pneumothorax	1	0.5
Medical		7	3.2
	Pneumonia	3	1.4
	Congestive heart failure	1	0.5
	Atelectasis	1	0.5
	Transient ischaemic attack	1	0.5
	Atrial fibrillation	1	0.5
Total		*13*	*6.0*

patients in whom less than three stations were biopsied. Nonetheless, a selection in stations to be biopsied should not be advised on the data of this study only.

In our hospital the use of CT increased during the study period (*table 3*). CT was not performed according to protocol and not performed in all patients. Since data were also either lost or insufficient, this study does not seem suitable for addressing any questions on the value of preoperative CT scanning for the assessment of mediastinal lymph node involvement.

In conclusion, CM is a safe procedure with a high diagnostic yield in the preoperative assessment of potentially operable NSCLC patients. With the evolving availability of PET scans the number of CMs will certainly reduce. However, in cases of central tumours, suspected mediastinal involvement on PET scan or the unavailability of PET scans, CM still should be performed.

NOTE

The data from this study were discussed at the Convention of the Dutch Society of Pulmonary Surgeons in Vaals, 2001.

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