POSTEROLATERAL THORACOTOMY COMPLICATING PARAPLEGIA

A.G. Ahangar, M.Ch.; I. A. Mir, MS; A.M. Dar, M.Ch; M.A. Bhat, M.Ch; G.N. Lone, M.Ch; Akhtar, MS; Zahid, MS ; Mushtaq, MS; Tariq, MS; A.A Guru, M.Ch

Abstract; Paraplegia complicating thoracotomy has been reported in literature in mid forties. However in sufficient data are available about the incidence of such a catastrophic complication. In the present study five cases of paraplegia following thoracotomy are presented. Pneumonectomy, lobectomy for bronchogenic carcinoma decortication for tubercular empyemas and thoracotomy for ductus ligation constituted one, one, two and one patient respectively. Two patients died in post operative period, two died in follow up and one patient is still on follow for the last twelve years.

Key words: Posterolateral thoracotomy, Paraplegia

JK-Practitioner 2002; 9(4): 236-238

INTRODUCTION

Paraplegia complicating thoracotomy for aortic operations is a well recognised catastrophic event. Less well recognised is the incidence of paraplegia after thoracotomy for pleural or pulmonary disease and in surgical procedures for malignant hypertension.

Injury to the spinal cord with resultant paraplegia usually results from attempts to control persistent bleeding at the posterior angle of intercostal incision or at the site of removal of a portion of vertebrae.

MATERIALS AND METHODS

The study was conducted in the department of cardiovascular and thoracic surgery SKIMS Soura Kashmir, India. All the patients were recorded with regard to type of disease, operations performed age and sex and the complication of paraplegia. Every attempt was made to find out the most probable cause with regard to extensive dissection in posterior angle of incision, use of electrocautery and oxidised cellulose. CT scan combined with myelo CT was the investigation of choice. Decompression for fractured vertebrae, extradural hematoma and removal of oxidised cellulose was the surgical modality. Some ways and means were devised to prevent the catastrophic complication.

OBSERVATION

The present study has shown that thoracotomy for seemingly innocuous conditions such as paraplegia following surgery for tubercular empyema, and ductus arteriosus and other lung and pleural disease is not only unusual but also unacceptable. The paraplegia recorded in present series is given in table I. The neurologic deficit was detected with in 1 to 72 hours after surgery. All these patients had extensive dissection in posterior angle of incision, all the measures were used to stop bleeding from

Table 1. Thoracotomy complicating paraplegia in present series

Age (yrs)	Sex	Diagnosis	Operation performed	Neurologic loss	Level	Outcome	Comment
57	M	Tubercular empyema	Decortication	Paraplegia	T6-T7	Not improved	Died of septicaemia
65	M	Bronchogenic carcinoma	Left lower lobectomy	Paraplegia	T6-T7	Not improved	Died two year later of metastasis
12	F	PDA	Ligation	Paraplegia	T6-T7	Not improved	Still on followup
59	M	Bronchogenic carcinoma	Left pneumonectomy	Paraplegia	T6-T7	Not improved	Died 4½ year later in a RTA
47	F	Tubercular empyema	Decortication	Paraplegia	T5	Not improved	Died of bleeding diathesis

From *the Department of Cardiovascular and Thoracic Surgery SKIMS,* Soura, *Srinagar* *(Ahangar, Mir, Dar, Lone, Bhat, Guru)*
Received February 2002 Accepted August 2002
***Correspondence:* Prof. A. G. Ahangar** M.Ch. Head of the Deptt. CVTS. SK Institute of Medical Sciences. Post bag, 27, Soura Srinagar 190011 Kashmir India.

the posterior angle of posterolateral thoracotomy, also in all these five patients there were fractures of adjacent ribs at posterior angle to get wide exposure for exposure of bleeders and or for dissection of the underlying pathology. CT myelogram was done in all the patients. Fracture of vertebrae T8-T9 was observed in one patient, complete block at T8-T9 was documented in two patients. In one there was complete transection of cord and in one no significant hematoma or block was noticed. Surgical decompensation attempted in three was of no help.

REVIEW OF LITERATURE

Paraplegia complicating posterior thoracotomy is rare but catastrophic. The study comprises 45 cases, 5 of our study and forty reported cases (Table 2). Paraplegia complicating thoracotomy for aortic operations is a well recognized catastrophic event. Its incidence is well-documented in surgery of atherosclerotic and dissecting thoracic aortic aneurysms, thoraco-abdominal aortic aneurysms, abdominal aneurysms, and coarctation of the aorta.

Paraplegia is one of the most dreaded complications of aortic operations. The more posterior the incision was toward the vertebrae, the greater the chance was for injury to the spinal cord. Bleeding at the costovertebral angle. Attempts at controlling the bleeding by electroacutery or by packing the wound with oxidized cellulose have been implicated in the causation of this complication. Other factors implicated in the causation of paraplegia include intraoperative blood loss, hypotension, ligation of intercostal vessels that might be supplying the arteria magna of Adamkiewicz, thrombosis of anterior spinal artery, epidural anesthesia, and epidural hematoma.

DISCUSSION

The incidence of paraplegia after thoracotomy is not well known. Our observations are at variance with with other reported series[1,2] because in our experience of 33

Table II: Thoracotomy complicating paraplegia - reported cases from review of literature

Author	year	Diagnosis	Opertion	Nerologic Level Loss (paraplegia)	Out come
Mosberg et al	1944	Malignant Hypertension	Bilateral supradiaphragmatic and Lower dorsal sympathectomy	T-12	Improved
Mosberg et al	1944	Malignant Hypertension	Bilateral supradiaphragmatic and lower doral sympathectomy	T-12	No imporvement
Mosberg et al	1946	Malignant Hypertension	Left thoracolumber sympathectomy; right thoracolumber sympathectomy	T-12	Died
*Bassett (2 cases)	1948	Malignant Hypertension	Sympathectomy	T8-T10	No improvement
*Mosberg et al (3 cases)	1954	Malignant Hypertension	Sympathectomy	T8-T10	No improvement
Billing and Robertson	1955	Tuberculous empyema	Drainage of tuberculosis cavity-left chest	T10	Died 2 months later
Nathan	1956	Malignant Hypertension	Thoracolumber sympathectomy	T-12	No improvement
Rouques and Passelecq	1957	Pulmonary tuberculosis	Thoracoplasty right	T-6	Improved
Binet	1961	Tuberculous pyothorax	Pleuropneumonectomy	T-6/T-7	No improvement
Corbin	1961	Pulmonary TB	Thoracoplasty	Paraplegia	Not known
Hughes & MacIntyre	1963	Malignant Hypertension	Thoracolumber sympathectomy	T-9	Improvement
Thomeret	1965	Pulmonary tuberculosis	Thoracoplasty after pneumonectomy	T-5-T-6	Improvement
Henson & Parsons	1967	Trauma	Left Lower lobectomy	T-6	No improvement
Mathew & John	1970	Bronchiectasis	Left pneumonectomy	T-4	Improved
Bennett	1975	Benign lung lesion	Left upper lobectomy;	T-6-T-7	Unknown
*Merlier & Thevenet (7 cases)	1980	Pulmonary tuberculosis	Thoracoplasty		
		Pancost tumor	Right upper lobectomy		
		Traumatic pyothorax	Thoracoplasty		
		Pulmonary tuberculosis	Left pleuropeumonectomy	T-4-T-5	No improvement
		Peptic esophagitis	Left thoracotomy Nissen operation		
		Neuroma 4th intercostal space	Excision of neuroma		
		Ganglioneuroma 8th intercostal space	Exicision of ganglioneuroma		
Nancekivell	1985	Bronchogenic Ca	Right pneumonectomy	T-5	No improvement
Tashiro et al	1987	Bronchogenic Ca	Right upper lobectomy;	T-5	Brown-Sequard syndrome (improvement)
Perez-Guerra & Holland	1988	Bronchogenic Ca	Left pneumonectomy;	T-5	No improvement
Johr & Salathe	1988	BronchogenicCa	Left pneumonectomy	T-5/T-6	Died
Batellier et al	1989	Bronchogenic Ca	Right upper lobectomy;	T-5	No improvement; died
*Short (2 cases)	1990	Bronchogenic Ca/	Right upper and middle lobectomy	T-5/T-6	No improvement
		Bronchogenic Ca	Right lower lobectomy		
Short	1990	Bronchogenic Ca	Right upper lobectomy right spastic monoplegia	T-5/T-6	Left leg improved;
*Wada et al (2 cases)	1993	Bronchogenic Ca	Right upper lobectomy;	T-5	Improved
Attar et al	1995	Bronchogenic Ca	LU lobectomy	T-6–T-7	Not improved Died
Attar et al	1995	Bronchogenic Ca	LL lobectomy	T-6–T-7	improved
*Attar et al (3 cases)	1995	Pulmonary tuberculosis	LU lobectomy	T-6–T-7	Not improved
		Tuberculous empyema	Decortication	T-6–T-7	Not improved
		Stab wound	Control of bleeding	T-6–T-7	Not improved

* Multiple patients reported by same authors had different or same diseases had undergone different or same surgical prucedures but had same level and similar outcome.

patients having dorsal or lumber sympathectomy none developed paraglegia. Our observations are in consistence with many authors[3,5]. All of them have reported paraplegia after pneumonectomy radical pulmonary section and post pneumonatomy epidural hematoma. The use of oxidised cellulose in all cases of present study has also been reported[6]. Based on our experience of about 3943 thoracotomies it is believed to be around 0.11 percent which is quiet high and unacceptable, but could be because of two reasons, firstly Attar et. al 1995[7] had not included any of PDA patient in their study which is a part of aortic surgery, and secondly none of their patients had massive, bleeding, hypotension and they had not used oxidised cellulose in any of their patient, in fact the PDA patient included in the study is because she developed this complication as a consequence of posterolateral thoracotomy and not due to surgery on ductus. As is evident from table II dorsolumbar sympathectomy for malignant hypertension was the commonest reported cause of paraplegia in 1940's. But in fifties and sixties, surgery for pulmonary tuberculosis was the commonest cause. Myelo CT as the investigation of choice and emergency decompression is the accepted mode of management[4,6,9]. Hospital mortality of two patients was because of re-exploration septicaemia and bleeding diathesis.

The greater chance of injury to spinal cord are - more posterior the incision towards the vertebrae, bleeding at the costovertebral angle, haphazard attempts at controlling the bleeding by electrocautery, packing the wound with oxidised cellulose, intraoperative blood loss, hypotension, ligation of intercostal vessels, thrombosis of anterior spinal artery, epidural anaesthesia and epidural hematoma. In the present study it can be said with certainty that the complication occurred because of extensive dissection in and around vertebral region, maximum use of cautery and oxidised cellulose, adjacent rib fractures at posterior angle while acting adequate exposure and ligation of intercostal vessels.

Of great concern is the paraplegic female who has been attending our OPD from last 14 years but we don't have a solution for her. It is emphasized that all the preventive measures can be taken/adopted and that should not limit the field of surgery in modern time and prevent this catastrophic complication.

REFERENCES

1. Mosberg WH Jr, Voris HC, Duffy J. Paraplegia as a complication of sympathectomy for hypertension. Ann Surg 1954;139:330-4.
2. Billings J, Robertson P. Paraplegia following chest surgeiy. Austr Ann Med 1955;4:141-4.
3. Johr M, Salathe M. Paraplegia after pneumonectomy. Schwetz Med Wochenschr 1988;118:1412-4.
4. Batellier J, Wihlm JM, Morand G, Witz JP. Paraplegia caused by extradural spinal hematoma after radical pulmonary lobectomy in cancer. Ann Chir 1989;43:210-4.
5. Perez-Guerra F, Holland JM. Epidural hematoma as a cause of postpneumonectomy paraplegia. Ann Thorac Surg 1985;39:282.
6. Short DH. Paraplegia associated with the use of oxidized cellulose in posterolatral thoractomy incisions. Ann Thorac Surg 1990;50:288-9.
7. Attar S, Hankin JR, Turney SZ, Krosna NJ, McLaughlin JS. Paraplegia after thoracotomy. Ann Thoracic Surgery 1995;59:1417-1416.
8. Walker WE. Paraplegia associated with thoractomy. Ann Thorac Surgl990;50:288-9.
9. Wada E, Yonenobu K, Eraba S, Kuwahara O, Ono K. Epidural migration of hemostatic agents as a cause of posthoractomy paraplegia. J Neurosurg 1993;78:658-60.