

Surgical resection of a giant mediastinal tumour with partial clamping of the superior vena cava without extracorporeal circulation



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Background

Perioperative management of mediastinal masses with superior vena cava (SVC) invasion is very complex due to compression caused by giant tumours and clamping complications.

Case Report

A 44-year-old man with previous history of smoking was admitted to the hospital with clinics of dyspnea and chest pain. He was diagnosed with a non-seminomatous germinal tumour sized 15x11x12cm and located in the anterior mediastinum. It also infiltrated pericardium, SVC and left upper lobe. The multidisciplinary oncological committee proposed induction chemotherapy based on Bleomycin plus surgical resection with radical intention.

Monitoring and vascular accesses

- Conventional monitoring
- Bispectral Index
- Cerebral oximetry
- Invasive hemodynamic parameters (ProaQT)
- TOF
- Peripheral venous accesses
- Central venous access in the lower limb

Induction & Maintenance

- No clinical nor radiological evidence of airway compromise
- Diagnostic video-laryngoscopy under sedation
- Rapid sequence induction with a left double-lumen tube
- General anaesthesia with sevoflurane, fentanyl and remifentanyl

Surgery

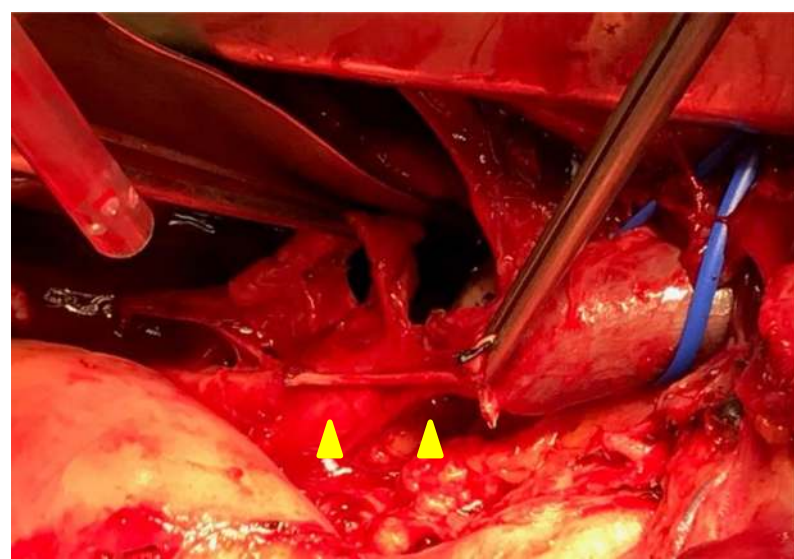
- Sternotomy + left thoracotomy + left cervicotomy
- Complete resection of the mass, the anterior area of pericardium and the brachiocephalic vein (until the junction with SVC)
- Partial resection of SVC (lumen reduced <50%)

End of surgery

- No tube exchange due to upper airway oedema
- Transfusion of 2 red blood cell units
- Extubated the day after surgery with no neurological damage
- Discharged 8 days after admission
- Oedema in head and arms

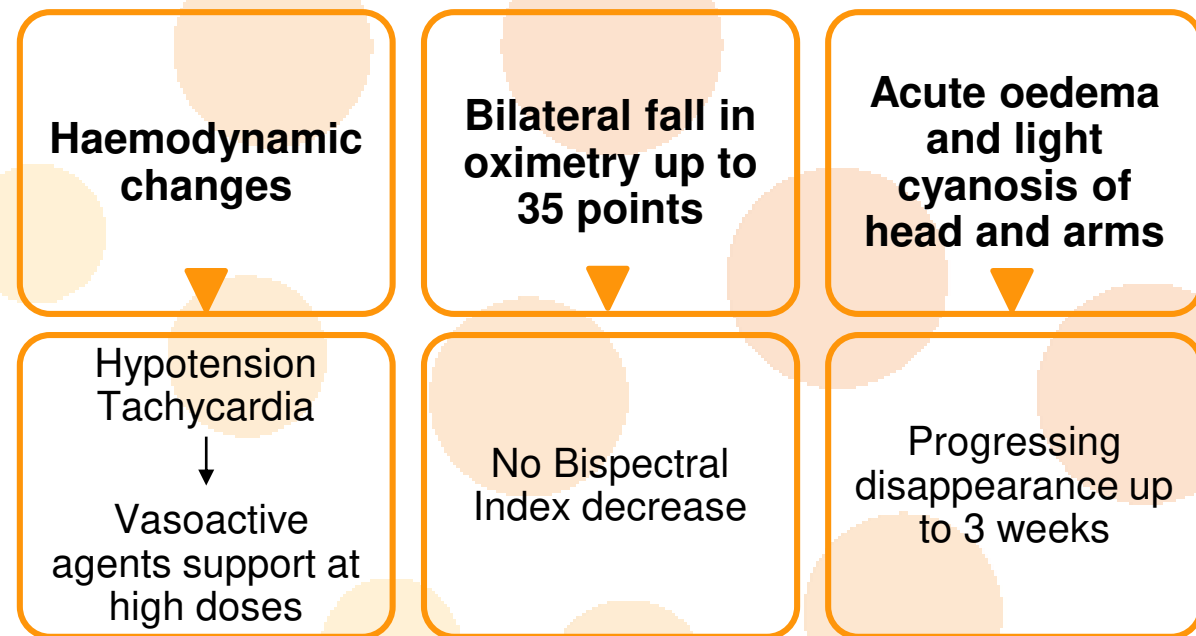


Preoperative CT Scan



Suture of SVC

Resection of brachiocephalic vein & partial clamping of SVC¹



Discussion

- Both complete and partial clamping of SVC → Decrease in the venous return of the upper body → Oedema and an impaired cerebral perfusion
- Avoided mainly by the use of Extracorporeal circulation or by a Venovenous / veno-right atrium bypass performed before or after clamping¹
- It isn't clear how long clamping can be tolerated without producing irreversible brain damage. It is reported a 290 min clamping in one case²
- Our case had a better clamping tolerance for the following reasons:
 - 1) SVC clamping was partial
 - 2) previous existence of collateral circulation secondary to left innominate vein thrombosis¹
- Despite a decrease in oximetry there was neither BIS drop nor neurological damage after awakening

Learning points

- Either partial or total clamping of the VCS during mediastinal mass resection entails a situation of great complexity that should be anticipated
- It hasn't been described in the literature how long clamping can be tolerated without neurological damage
- Some acute complications such as oedema are reversible