



Case Report

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Anesthetic Management of Craniotomy for a Patient with a Large Right Atrial Tumor

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Abstract

Introduction: We present the successful management of a unique case presented with hemorrhagic metastatic brain melanoma associated with a big metastatic mass in the right atrium.

Case presentation: A 68 year old man with recurrent melanoma of the chest wall presented for an emergent craniotomy for a hemorrhagic metastatic brain lesion. A large right atrial mass was found during his neurological workup. General anesthesia with etomidate induction, isoflurane and remifentanyl maintenance was conducted. A central venous catheter was placed and position was confirmed using fluoroscopy. Preload optimization and neutral head position led to adequate cardiac output maintenance without increasing intracranial pressure. Immediate extubation was done following the surgery and the patient was discharged home on the fifth postoperative day after improvement of his neurological symptoms.

Conclusion: We presented a unique case with bleeding metastatic brain melanoma associated with right atrial secondary tumor. The anesthetic management was very challenging. Preload optimization and neutral head positioning were the key measures for managing this patient.

Keywords: Heart neoplasm; Craniotomy; Anesthesia

Introduction

Hemorrhage in an intracranial metastatic melanoma is not uncommon and can be a terminal event. On the other hand, a secondary cardiac tumor from a melanoma is uncommon [1]. We are presenting a 68 year-old man who required an emergent craniotomy for a bleeding metastatic melanoma and had a co-existing large right atrial mass. We will discuss the anesthetic challenges and techniques that led to a successful outcome.

Case Presentation

A 68-year-old man from whom a melanoma had been resected from the posterior chest four years previously presented at our hospital for excision of a new chest wall lesion, which proved to be metastatic melanoma. Several days later he developed sudden and rapidly progressive right-sided weakness. Neuro imaging (Figure 1) demonstrated a large, hemorrhagic lesion in the left anterior parietal

lobe with significant surrounding edema and mass effect, consistent with a hemorrhagic melanoma metastasis. Because of progressive neurological deterioration, the decision was made to proceed with obtundation, as a life-saving measure.

Computed tomographic (CT) scanning of the chest revealed a filling defect in the right atrium, confirmed by trans-thoracic echocardiography, showing a 3.5 x 3.3 cm mass that occupied the inferior two-thirds of the right atrium (Figure 2). We elected to employ general anesthesia with tracheal intubation and invasive monitoring, including arterial and central lines. Anesthesia was induced with etomidate and low-dose remifentanyl, endotracheal intubation was done using direct laryngoscope and succinylcholine. Next, a left internal jugular vein catheter was placed and its location confirmed by fluoroscopy (the tip of the catheter was placed at the junction of the superior vena cava with the right atrium, above the atrial mass).

Anesthesia was maintained with remifentanyl infusion, isoflurane, and rocuronium for three hours. Strict hemodynamic control and euvolemia were maintained throughout the case; the central venous pressure was maintained between 12 and 15 mmHg. The head was positioned and secured in a neutral position to ensure proper filling of the right atrium; infiltration of the pins sites, the incision, and circumferentially around the incision was performed with an equal

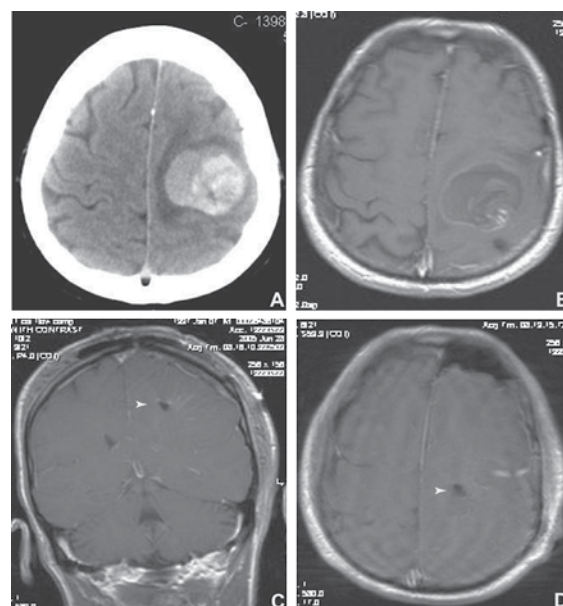


Figure 1: Neuroimaging of the tumor before and after resection. A, Non-contrast, axial CT scan of the brain showing a hemorrhagic lesion with surrounding hypointense edema and mass effect with sulcal effacement in the posterior left frontal and anterior parietal regions. B, Gadolinium enhanced, T1-weighted axial image obtained several hours after sudden neurological deterioration showing a wisp of enhancement (white, hyperintense) and surrounding hemorrhage (dark, consistent with recent bleeding). C, D, coronal and axial T1-weighted, gadolinium enhanced images after resection, which demonstrate complete resection of tumor and clot; an arrow marks the small resection cavity remaining after resection.

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Figure 2: Transthoracic echo showing the mass filling almost two-thirds of the cavity of the right atrium.

mixture of 1% xylocaine and 1:100,000 epinephrine and 0.25% bupivacaine for rapid and long-standing (4-6 hours) local anesthetic. The operation proceeded uneventfully and the tumor and hemorrhage were removed completely. The patient was extubated at the end of the craniotomy, awakened and examined neurologically, then transferred to the post-anesthesia care unit in a stable condition. Five days later, he was discharged from the hospital in stable condition, with improvement in his neurological status, and no cardiovascular sequelae.

Discussion

Hemorrhage into a tumor in a patient with melanoma metastatic to the brain is not uncommon and may be a terminal event. Despite the impaired prognosis of many patients with brain metastasis, resective surgery for symptomatic brain metastases can be worthwhile in select cases [2].

On the other hand, secondary cardiac tumors from malignant melanoma are relatively uncommon. Cardiac tumors may be symptomatic or found incidentally. Symptoms generally are determined by the intra-cardiac location and so may present with a variety of manifestations: with obstruction of the circulation, and they may produce heart failure, which, on occasion, may be fulminant. When the tumor interferes with the heart valve function, it can cause regurgitation. If there is direct invasion of the myocardium, metastatic cardiac tumors may impair contractility, induce arrhythmias, heart block, or result in pericardial effusion. Finally, tumor embolization (systemic or pulmonic), may lead to constitutional or systemic symptoms. Specific signs and symptoms are determined by location of the tumor in the heart and not by histopathology [3,4].

The case we present here is distinctive in that the patient presented with symptomatic and progressive neurological deterioration and it was discovered at that the time of presentation for neurosurgical intervention that the patient also harbored a cardiac mass.

To manage patients with intra-cardiac lesions optimally, maintenance of preload is important to avoid obstruction to the blood flow by the lesion (in this case, by occlusion of the tricuspid valve). On the other hand, fluid overload may exacerbate the congestive heart failure and should be avoided, a feature generally preferred as well in the face of significant cerebral edema. The Trendelenburg position is advised by some to maintain the preload, which we also needed to avoid, since it has a detrimental effect on intracranial pressure especially in the face of a hemorrhagic mass with significant,

surrounding vasogenic edema and surgical access to the cranial tumor.

Finally, we faced the challenge of optimizing preload without increasing the ICP, which we accomplished by maintaining the head in a neutral position, which enhanced filling of the right atrium and minimized cerebral venous congestion.

Since placement of a central venous access catheter may carry risk for tumor dislodgement or embolization, careful placement and confirmation of the catheter tip site by fluoroscopy can minimize this risk, which we employed here. This was a unique case of a patient with a large right atrium tumor in whom an urgent craniotomy needed to be performed. Several useful and commonly available adjuncts and pharmacological measures were employed to insure a safe and optimal anesthetic and surgical environment. This patient represents an unusual and perhaps unique case in the literature whose management was adapted using commonly available anesthetic tools, to optimize two competing pathophysiological challenges with a successful outcome.

Conclusion

We presented a unique case with bleeding metastatic brain melanoma associated with right atrial secondary tumor. The anesthetic management was very challenging. Preload optimization and neutral head positioning were the key measures for managing this patient.

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