The importance of intraoperative transoesophageal monitoring when operating on renal cancers that involve the right atrium

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ABSTRACT

The surgical treatment of advanced renal cancers is challenging. Renal cell carcinoma is interesting in that it invades the vasculature and can extend up as far as the right atrium. Extension of tumour thrombus into the right atrium represents level IV disease, according to Robson staging. Transoesophageal echocardiography is useful for diagnostic purposes. It is also of great value for intraoperative cardiac monitoring and to confirm the extent of vascular involvement.

KEYWORDS

Renal cell carcinoma – Transoesophageal echocardiography

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Case History

A 53-year-old woman presented with a cough and a small volume of haemoptysis. She was diagnosed with a pulmonary embolus. Her computed tomography incidentally picked up a large right renal carcinoma extending along the renal vein and inferior vena cava. Follow-up imaging prior to surgery revealed that the cranial extent of the tumour thrombus now lay just within the right atrium (Fig 1).

The patient underwent a sternolaparotomy (Fig 2) by a senior cardiothoracic surgeon and urologist, with anaesthesia delivered by an experienced cardiothoracic anaesthetist. A radical nephrectomy was performed (Fig 3) with clearing of the tumour from the inferior vena cava.

The right atrium was opened and the tumour removed (Fig 4). Before discontinuing cardiopulmonary bypass, transoesophageal echocardiography revealed a new tumour embolus moving freely in the right atrium (Fig 5), which then migrated to the pulmonary trunk. A tumour embolectomy was performed through a longitudinal pulmonary arteriotomy before the patient reverted to sinus rhythm and cardiopulmonary bypass was discontinued.

Discussion

Intraoperative tumour thrombus embolisation into the heart and/or beyond can have fatal consequences if not recognised and treated immediately. The clinical consequences are determined by the size of the embolus. If it is larger than the tricuspid annulus (approximately 3cm), it will remain in the right atrium unless it breaks up into fragments. Small

masses pass distally into the pulmonary vasculature but rarely result in fatal consequences.

Intermediate sized emboli (as in this case) are potentially the most dangerous. They may obstruct at the tricuspid annulus, the level of the pulmonary valve, pulmonary bifurcation, or the left or right main stem pulmonary arteries; these scenarios carry significant haemodynamic

Figure 1 Preoperative coronal computed tomography of patient's advanced renal carcinoma, clearly seen invading the inferior vena cava

Figure 2 Sternotomy and right atriotomy

Figure 4 5cm × 3cm atrial thromboembolus

Figure 3 Right nephrectomy specimen

Figure 5 Intraoperative transoesophageal echocardiography revealing intra-atrial thromboembolus nearly obstructing the tricuspid valve, similar in appearance to an atrial myxoma

consequences including right heart failure¹ or dramatic ventilation/perfusion mismatches.²

Conclusions

In cases such as this, transoesophageal echocardiography is helpful not only for assessment of tumour thrombus and cardiac function but also for continuous surveillance. Thromboemboli may migrate centrally and can result in deleterious haemodynamic and/or ventilation-perfusion consequences. Continuous monitoring and timely communication between anaesthetist and surgeons are essential to enable rapid diagnosis of intracardiac emboli and direct immediate treatment.

Authors' note

Nilay Patel sadly passed away in May 2014.

References

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