A 60-year-old man who wishes to travel after neurosurgery

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Is this patient fit for air travel after his decompressive craniectomy? What are the main points to consider as he plans his trip?

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CASE SCENARIO

Jack is a 60-year-old man who was in good health until he suffered a fall on a wet path. He was attending a gym most days and had been taking a statin and low-dose aspirin for five years. Following the fall six months ago, however, he suffered a massive subdural bleed. Urgent surgery to evacuate the haemorrhage was carried out but his intracranial pressure proved difficult to control. Four days after the injury, decompressive craniectomy was performed. Following intensive rehabilitation, Jack is now back home but he is dependent on a wheelchair. The craniectomy wound was not repaired and he was given a protective helmet to wear.

Jack now wants to visit his daughter in South Africa. Is he fit to travel? What are the pros and cons of decompressive craniectomy surgery?

DISCUSSION

It is very likely that Jack is fit to travel. The main concern with airline travel after neurosurgery is related to the possible presence of intracranial air following injury and/or surgery. At six months after the injury and surgery this would not be a factor. Travel within a pressurised cabin on a large aircraft would also modify this risk.

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Jack's main risk with respect to travel is that of deep venous thrombosis (DVT), which may be significant in an individual who is relatively immobile and dependent on a wheelchair. If he has substantial cognitive impairment then this will also modify his ability to travel successfully without substantial physical aid.

Modification of Jack's risk for travel-related DVT may include doppler ultrasonography of the lower limbs (as baseline) prior to travel and short term antiplatelet/anticoagulant therapy at the time of travel. He is at some risk of DVT because of his condition, and the flight would increase this risk if he already had a thrombosis, which might propagate or embolise under these conditions. Good hydration and mobilisation techniques before and during the flight would be essential. His risk of intracranial complications related to moderate dose antiplatelet/anticoagulant therapy would be relatively low at this stage.

Decompressive craniectomy

Decompressive craniectomy is an effective surgical tool for the management of severe refractory raised intracranial pressure. The indications and timing for its use are relatively controversial and it is also sometimes used in the management of large hemispheric stroke.[1,2] The popularity of this procedure has increased over the past 10 or so years, and the American military has utilised it quite extensively in the acute management of severe (especially penetrating) combat injuries, allowing early (usually airborne) evacuation.[3]

The procedure lowers the intracranial pressure effectively and will increase survival in selected patients. Time in intensive care is decreased. There are conflicting data as to whether there is improvement in functional outcome. As with all interventions of this nature, the risk–benefit ratio clearly hinges on patient selection.

The complication rate of decompressive craniectomy ranges between 16 and 34% in the literature.[4] Apart from the requirement for further surgery to reconstruct the skull, the complications can include: marginal injury and ischaemia to parts of the brain that herniate through the defect, extra-axial collections or haemorrhage, infection (requiring prosthesis removal and further surgery), direct brain injury from having the defect, seizures and cerebrospinal fluid circulation disorders (which may necessitate shunts).

In addition, there is 'syndrome of the trephined', in which focal or global neurological deficits may result from large skull defects.[5] The symptoms and signs of this condition are reversed by cranioplasty. It is helpful to consider that failure to improve in patients who have significant craniectomy defects, such as Jack, may be a result, at least partially, of this. Therefore cranioplasty should be viewed as a functional, not only cosmetic, surgical procedure.

Cranioplasty

Most of the complications described above may be a consequence or complication of the secondary procedure of cranioplasty. Small craniectomy defects may remain unrepaired; however, defects that result from surgery to manage intracranial pressure are by necessity large, and therefore repair is almost always necessary in patients with good functional overall outcome after treatment.

Cranioplasty repair plates are usually constructed of acrylic or titanium mesh. It is often useful to have these plates custom-made from CT-derived templates, which allow exact fit and an excellent cosmetic result. The removed bone plate can also be stored (frozen, or subcutaneously in the abdominal wall of the patient) for later use if custom-made plates are unavailable or not desired.

CONCLUSION

The risks of Jack travelling are not insurmountable but there are multifactorial considerations, as outlined above. It would be unwise for him to travel unaccompanied. Although the use of craniectomy in the management of trauma is controversial, most experts would agree that reconstruction of large defects is desirable to prevent further injury and potential deficit from the defect itself, and for cosmesis. All reasonable efforts should be made to reconstruct the skull following craniectomy and this can usually be done within three months of the injury, depending on comorbid conditions. MT

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