



## A Wish List to any Case Report

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Evidence-based medicine or practicing medicine based on the quality evidence is not wrong. Unfortunately, for a variety of reasons, not every clinically relevant question can be answered via a study. In medicine, a different kind of evidence comes from case report. Case report narrates a unique story of an individual patient. We love it because, besides its potential educational values, we love stories that is a human nature. However, we need to be careful when writing and reading a case report because, sometimes, a case report could end up with “misleading” contents as a result of missing information and inadequate differential diagnosis and literature review.

Chen, et al. recently reported a case in which patient having a posterior fossa surgery for removal of a cerebellar tumor lesion in prone position. The patient received intravenous 20% mannitol 250 ml per surgeon’s request. Twenty-five minutes after the completion of mannitol administration, patient became hypotensive and bradycardic. Electrocardiography suggested ventricular fibrillation. Patient was turned supine for cardiopulmonary resuscitation. Transesophageal echocardiography was performed and showed *left* atrium and ventricle enlargement and asystole. A temporary pacemaker was placed in the operating room. Patients died in the intensive care unit later [1].

We appreciate the authors sharing their experience via a case report. However, as a provider taking care of patients on a daily basis, I would bring up a wish list to any case report and use this particular case as an example.

### Pertinent Details

In this case, there is no mention of this patient’s cardiac history and other pertinent medical history. Moreover, where is the brain lesion? What is the potential pathological diagnosis? What is the anatomical relationship to other brain structures, such as the brain stem? Is there any intraoperative neurophysiological monitoring? Is there any chance the bradycardia and hypotension may be related to the stimulation of the parasympathetic nerves or centers? How much is blood loss? How much is urine output (following mannitol’s

administration) when the crisis first occurred? Was the patient hypovolemia at that point? How about the size of the right atrium and ventricle? Any signs of intracardiac thrombus? Any signs of pulmonary embolism? Moreover, it would be even better if the authors shared the study results of magnetic resonance imaging and transesophageal echocardiography.

### Intervention and Response

Any intervention is given to correct the hyperkalemia? Did the patient respond to the administration of epinephrine? Was the anesthesia turned off when the blood pressure was low? What was the end-tidal carbon dioxide (ETCO<sub>2</sub>)? It seemed arterial blood carbon dioxide (PaCO<sub>2</sub>) in the normal range based on the blood gas analysis.

### Differential Diagnosis

What are the potential differential diagnoses for the described crisis? Any chance this may be pulmonary embolism? Pulmonary embolism is not uncommon in patients having brain tumor surgery [2]. Prone position may facilitate the mobilization of deep venous thrombus to pulmonary vasculature (personal opinion). This is why the transesophageal echocardiography report needs to also describe the size of the right atrium and ventricle and any signs of intracardiac thrombus. Any chance this is brain tumor and/or surgery itself related? Asystole can occur during posterior fossa neurosurgical procedures, especially when surgical manipulation is carried out in the vicinity of the brain stem [3]. The trigemino-cardiac reflex has been implicated as one of the causes [4].

### Literature Review

Hyperkalemia and hyponatremia are two common electrolyte abnormalities following mannitol’s administration. However, these abnormalities are normally inconsequential. Mannitol is a relatively safe pharmacological agent when it is used per the recommendation based on the 50+ years of clinical experience [5]. There are no direct and convincing evidence showing a linkage between mannitol-induced hyperkalemia and cardiac arrest. The authors mentioned that the purpose of giv-

ing mannitol was to control intracranial pressure. This is not true as the intracranial pressure is zero when the cranium is opened. It is more precise if the authors had said it was for brain relaxation [6].

### Never Making an Unwavering Judgement

The case seems completely engaged in a discussion of mannitol-induced potentially inconsequential hyperkalemia. Any case report should avoid falling in a trap by focusing on one aspect of the whole picture and giving up the attention to other potential causes. We should always be careful when making a cause-effect conclusion based on just one case. This can easily go astray and the case report then became “misleading”. Think about this, even a big cohort study with thousands of patients normally conclude with an “association” between X and Y, almost never a “causal” relation between X and Y.

### Take Home Message

Be careful with the take home message. You do not want to be too strong and conclusive. After all, this is just one case. Otherwise, the medical journals will be very passionate about soliciting case reports.

In summary, case report has values in stimulating discussion and inspiring further exploration. However, it has inherent limitations. We need to take the responsibility when reporting a case by providing adequate and relevant information and avoiding premature and misleading conclusions. The goal is to disseminate valuable educational message and promote outcome improvement.

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#### Additional publication details

**Journal short name:** *Transl Perioper & Pain Med*

**Received Date:** January 12, 2019

**Accepted Date:** January 13, 2019

**Published Date:** January 15, 2019

**Citation:** Meng L. A Wish List to any Case Report. *Transl Perioper & Pain Med* 2019; 6 (1):3-4

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