Additional use for adenosine in anaesthesia and surgery

Editor—We read with interest the review article entitled ‘Potential value of adenosine 5’-triphosphate (ATP) and adenosine in anaesthesia and intensive care medicine’. For completeness, we suggest an additional use of adenosine in anaesthesia and surgery.

The authors mentioned its use for supraventricular tachycardia, and for the diagnosis of broad and narrow complex tachycardia at doses of up to 15 mg. Our experience with adenosine is with much larger doses, up to 36 mg i.v. (0.25–0.5 mg kg\(^{-1}\) for thoracic endovascular stent graft placement). This causes transient cardiac asystole for 15–20 s.

Although not approved by the Food and Drug Administration for the purpose of inducing cardiac arrest, several articles in the literature support its use in vascular surgery. In particular, during stent-grafts for thoracic aortic aneurysm (TAA), dissections and transections, in which temporary asystole is used to prevent downward migration of the device during stent placement. Precision in stent deployment is essential and requires, usually, <20 s of reduced afterload.

Our experience with endovascular stent surgery encompasses an 11 yr period, both with abdominal and thoracic aortic aneurysms and a recent published study of 100 patients over 3 yr undergoing TAA surgery by the stent method. Of these 100 patients, 22 received adenosine boluses of 18–36 mg for the purpose of inducing transient cardiac arrest.

While the authors’ mentioned its potential use for blood pressure reduction by i.v. infusion (50–350 \(\mu\)g kg\(^{-1}\) min\(^{-1}\)), we, however, acutely reduce arterial pressure by an i.v. bolus. A dramatic decrease in arterial pressure by an i.v. bolus is related to a reduction or brief cessation in heart rate and contractility. This is in contrast to what the authors quoted that 40 mg ATP induced a moderate decrease in arterial pressure without a change in heart rate.

We agree with Skrabanja and colleagues that the haemodynamic effects of adenosine are brief and transient, owing to its rapid metabolism. Since adenosine’s action is at the purinergic receptors, drugs that interfere with nucleotide metabolism such as dipyridamole, can markedly enhance its effect. Thus, even usual doses of 6–12 mg can induce asystole. On the other hand, competitive antagonists of adenosine (i.e. methylxanthines, such as caffeine, theophylline, and amrinone) may demonstrate resistance to its effects and an increased dose may be required.

Finally, patients presenting with TAA frequently have co-morbidities in which adenosine should be used only with caution. Obstructive lung disease not associated with bronchoconstriction does not preclude its use. However, in patients with a history of reactive airways its use should be avoided. We also avoid its use in patients with intrinsic A–V nodal block or pharmacologic A–V nodal slowing with drugs such as digoxin or calcium channel blockers.

C. Kakazu
M. Lippmann*
R. A. White
Torrance, CA, USA
*E-mail: smaddox@ladhs.org

Editor—We thank Dr Kazaku and Dr Lippmann for their additional comments. Although we have no personal experience, we believe that adenosine indeed can be a valuable tool in achieving optimal surgical conditions in TAA patients.

In modern anaesthesia we frequently use the adverse effects of a drug in a specific situation to achieve an effect that would be detrimental in normal clinical practice, for example cardiac arrest.

If clinically indicated the use of adenosine in patients with intrinsic or pharmacological A–V nodal block temporary ventricular pacing could be considered. In patients with asthma, bronchoconstrictive or bronchospasmic disease adenosine remains contraindicated, as adenosine selectively interacts with activated mast cells, with subsequent release of other mediators.

A. T. P. Skrabanja*
E. A. C. Bouman
P. C. Dagnelie
Maastricht, The Netherlands
*E-mail: arno.skrabanja@epid.unimaas.nl

1 Skrabanja ATP, Bouman EAC, Dagnelie PC. Potential value of adenosine 5’-triphosphate (ATP) and adenosine in anaesthesia and intensive care medicine. Br J Anaesth 2005; 94: 556–62
Correspondence


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Epidural stimulation test vs epidural ECG test for checking epidural catheter placement

Editor—It is with great interest that I read the excellent literature review of pain management techniques for pediatric practice by Lonnqvist and Morton.1 However, I should like to point out that the statements regarding epidural stimulation testing are not entirely correct.

I agree with the authors’ statement that by using epidural electrocardiography (ECG) test, it is possible to determine correct threading placement after administering neuromuscular blocking agents or epidural anesthetics.1 It is true that epidural ECG technique will not exclude a catheter lying at the appropriate segmental level in the subarachnoid space or intravascularly.2 However, the statement ‘neither of the two techniques described by Tsui will exclude a catheter lying at the appropriate segmental level but not in the subarachnoid space or intravascularly’ is incorrect and misleading concerning the epidural stimulation test.3 For epidural stimulation testing, our previous studies have demonstrated that a low current between 1–10 mA applied through the epidural catheter results in a motor response indicating the catheter is in the epidural space.3 If the catheter is located in the subarachnoid space, the motor response found resultant of electrical stimulation is a positive segmental motor response (<1 mA).3 If the catheter is located in the subdural space, electrical stimulation results in a multiple segmental motor response (<1 mA).4 Subarachnoid and subdurally positioned epidural catheters elicit motor responses with a lower threshold current (<1 mA) because the stimulating catheter is very close or in direct contact with highly conductive cerebrospinal fluid (CSF).4,5 The electrical stimulation technique can also exclude a catheter lying intravascularly; the stimulation test will result in the electrical current remaining or returning to baseline threshold current (1–10 mA) in the situation of intravascular placement, even after local anesthetic injection.5 Thus, we believe that the newly introduced epidural stimulation test can provide objective and practical information regarding epidural catheter location including subarachnoid and intravascular placement.

B. C. H. Tsui
Edmonton, Canada
E-mail: btsui@ualberta.ca

Follow-up ward rounds after intensive care—what do the patients and their visitors think?

Editor—We have previously reported on starting a routine follow-up after critical care in this hospital.1 We now report the results of the first year of our routine anonymous patient satisfaction survey.

Each week there are two follow-up ward rounds when all discharges are seen by the outreach team consisting of a consultant, a senior nurse and a trainee doctor who was on duty the preceding weekend. At the patient visit a questionnaire is completed by the outreach team and any other problems dealt with. When this has been finished the patient is handed a letter. The letter is signed by the Consultant and the patient invited to complete an open text section and write anything that is good but also anything that could be improved. The next section is for the visitors and they are asked to complete it in the same way. Under the signature is a question that asks if this visit was of value with a yes/no tick box. A self-addressed envelope is attached to enable the reply to be sent using the hospital mail system. It is stressed verbally and in the letter that this is anonymous from the patient unless they want to fill in their name, in which case a reply is promised. Because this is an anonymous questionnaire and completion is optional, ethical approval was thought unnecessary.

From January 1 to December 31, 2004, 557 patients were visited after an ICU admission and 315 comment letters given out. Of the 242 patients not given a letter, 88 had died, 55 had either been discharged to another unit or already home, 39 patients were not given a letter (too unwell or not able to understand the letter) and in a further 60, it was unclear if a comment letter had been issued.

In total, 118 (37%) replies were received and 111 (94%) contained positive comments. Some contained both positive and negative comments. Eighteen (15%) contained a comment about things that could be improved including: frustration at the long delay for a ward bed, creaking doors, small relatives room, lack of a fan, visiting during ward rounds and the Doctors office should not be in a clinical area.