

Identifying Patients Who Need Extra Heparin

To the Editor:—Bull *et al.* described a technique for monitoring heparin effect during extracorporeal circulation.¹ I write to describe an adaptation of the technique that identifies patients who need abnormally high doses of heparin. Prior to heparinization, I perform an "in vitro," heparinized, activated clotting time (ACT test). A blood sample is mixed with an amount of heparin calculated to represent a 3 mg/kg dose:

$$\frac{(\text{wt in kg})(3 \text{ mg/kg heparin})}{(\text{nomogram blood volume in ml})} = \text{mg heparin/ml blood}$$

When the ACT of this sample is less than 200 seconds, the patient will invariably need abnormally high doses of heparin. (One patient whose heparinized ACT was 140 sec needed 10 mg/kg heparin. Proper heparin activity was verified by laboratory analysis.) This heparinized ACT test allows adjustment of initial heparin doses, thus achieving adequate heparinization more quickly. The heparinized ACT does not correlate well

with the ACT obtained after administration of 3 mg/kg heparin. Thus, this is a qualitative test.

Since heparin exerts its effect by interacting with antithrombin III,² an abnormal heparin requirement may indicate antithrombin III deficiency. Therefore, an abnormal preoperative heparinized ACT would be an indication for administration of plasma or blood to patients who need intraoperative anticoagulation.

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REFERENCES

1. Bull MH, Huse WM, Bull BS: Evaluation of tests used to monitor heparin therapy during extracorporeal circulation. *ANESTHESIOLOGY* 43:346-353, 1975
2. Rosenberg RD: Actions and interactions of antithrombin and heparin. *N Engl J Med* 292:146-150, 1975

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Disposable EKG Pads for Peripheral Nerve Stimulation

To the Editor:—Anesthesiologists are frequently confronted with the problem of monitoring neuromuscular blockade easily and effectively without injuring the patient. I have successfully used disposable EKG electrode pads for monitoring neuromuscular blockade in the following manner.

While the patient is still awake, disposable EKG electrode pads are placed on the appropriate locations for nerve stimulation. This usually has been the elbow and wrist, or just the wrist for ulnar nerve stimulation, but the lateral lower leg can be used for lateral peroneal nerve stimulation, or the cheek for facial nerve stimulation. Two 2-inch alligator clips with a 3/8-inch-diameter base are placed on the metal connectors at the distal ends of the extension lead wires, where the metal hypodermic needle electrodes were placed previously. Then,

the alligator clips are made to grasp the metal connectors on the EKG pads. Proper care is taken in positioning to avoid pressure points. The twin connectors in the molded plastic plug at the proximal end of the extension lead wire are attached appropriately to the nerve stimulator box. The box then is placed near the anesthesiologist where it can be operated by a simple one-handed manipulation. Thus the degree of muscle relaxation can be determined continuously or intermittently by the flick of a switch.

At present the two most common techniques for monitoring neuromuscular stimulation include the use of spherical-ended probe electrodes attached directly to the nerve stimulator box, or metal hypodermic needle electrodes on the end of an extension lead wire. Both of these techniques have dis-