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\* Estafanous FG: The choice of inotropes following cardiopulmonary bypass: *Con*: Amrinone is not a first-choice inotropic following cardiopulmonary bypass. *J Cardiothor Vasc Anesth* 5:184-186, 1991.

† Al-Wathiqui MH, Shimshak TM, Brooks HL, Preuss KC, Wynsen JC, Gross GJ, Warltier DC: Comparative effects of inotropic agents on coronary and systemic hemodynamics of conscious dogs: Actions of milrinone, dopamine, ouabain and MCI-154. *Pharmacology* 36:217-227, 1988.

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## Peripheral Nerve Injury and Automatic Blood Pressure Measurement

*To the Editor:*—In a recent report<sup>1</sup> describing radial nerve injury in association with use of an automated blood pressure monitor, the authors stated that they were unaware of any publication reporting on radial nerve injury caused by a blood pressure cuff.

In 1982 we published a report<sup>2</sup> describing radial nerve injury due to automatic blood pressure measurement in a cachectic patient (50 kg and 172 cm) with very thin arms.

Our conclusion then was that in very light-weight patients, automatically cycled blood pressure monitors should be applied only when brief intervals between measurements is not demanded. Continuous noninvasive blood pressure measurement with a new operational concept using the unloaded artery principle of operation\* has proved a useful monitor<sup>3</sup> without detrimental effects to the finger, where the cuff for the measurement is applied.<sup>4</sup>

In addition, we would like to bring to your attention a case describing radial nerve palsy in a premature infant after long-term measurement of blood pressure.<sup>5</sup>

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\* Penaz J: Photoelectric measurement of blood pressure, volume, and flow in the finger. Tenth International Conference on Medical and Biological Engineering, 1973, p 104.

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## A Cause for Hemodynamic Instability during Hepatic Tumor Resection

*To the Editor:*—Elevated concentrations of circulating catecholamines have not previously been reported in association with primary hepatic tumors. We would like to report a 10-month-old baby girl with an intrahepatic tumor who developed severe hemodynamic instability during surgical resection. The highest preoperative blood pressure

was 120/80 mmHg, recorded while the patient was crying vigorously. Preoperatively, serum glutamic-oxaloacetic transaminase, serum glutamic-pyruvic transaminase, alkaline phosphatase, and lactate dehydrogenase concentrations were increased, and the  $\alpha$  fetoprotein concentration was normal. Celiac and superior mesenteric arteriography

TABLE 1. Catecholamine Concentrations

Test	Low Blood Pressure* (60/30 mmHg)	High Blood Pressure* (182/126 mmHg)	Postoperative		Normal
			1 Month	3 Months	
Norepinephrine (pg/ml)	2,524	40,120	178	13,760	110-410
Epinephrine (pg/ml)	376	188	86		<50
Dopamine (pg/ml)	108	5,200			<30

\* 7 min apart.

showed a large, hypervascular mass occupying and extending from the medial segment of the left lobe of the liver, consistent with a hepatoblastoma.

Anesthesia for partial hepatic resection consisted of fentanyl ( $62 \mu\text{g} \cdot \text{kg}^{-1}$ ), pancuronium, and isoflurane. Induction of anesthesia was tolerated well. Vital signs were stable for 10 min after incision. Manipulation of the hepatic tumor resulted in increased arterial blood pressure to 220/130 mmHg, lasting for 2-3 min, followed by a decrease to a systolic pressure of 60 mmHg. Hemoglobin oxygen saturation, end-tidal carbon dioxide, arterial blood gases, serum glucose, and ionized calcium were unchanged during these transient increases in blood pressure.

Cycles of alternating hyper/hypotension persisted until shortly before the completion of interruption in the tumor's blood supply. Catecholamine concentrations were measured intraoperatively during one of the periods of blood pressure instability and were analyzed by Smith Kline Bio-Science Laboratories using high-pressure liquid chromatography with a cation exchange column and an electrochemical detector (table 1).

Microscopic appearance of the tissue was interpreted as anaplastic hepatoblastoma. The patient's liver tumor recurred, and 3 months later she developed a lesion in the right humerus. Biopsy of this lesion and review of the previous slides led the pathologist to change the diagnosis to neuroblastoma. The patient's condition continued to deteriorate despite therapy, and she died 5 months after surgery. Permission for autopsy was not obtained. It is unknown whether the liver tumor was a primary tumor or a metastasis from an occult primary tumor.

Anesthesiologists should be aware that neuroblastomas may masquerade as other tumors<sup>1-3</sup> and that, neuroblastomas may secrete catecholamines that can cause hemodynamic instability during resection.<sup>4-6</sup> As many as 19% of patients with documented neurogenic tumors are found to be hypertensive.<sup>4</sup> The case reported here is unusual

in that typically there is a paucity of storage granules within neuroblastomas as compared to pheochromocytomas, and, therefore, catecholamines are not stored and released in large quantities.<sup>4,8,9</sup>

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## Burns Associated with Pulse Oximetry during Magnetic Resonance Imaging

*To the Editor:*—We recently have become aware of two patients who suffered burns associated with the use of a pulse oximeter during magnetic resonance imaging (MRI) under general anesthesia. One patient, a man who had undergone imaging of the cervical spine, sustained a full-thickness burn requiring skin grafting of the tip of the little finger where the pulse oximeter sensor had been placed. The second patient, an infant, underwent scanning of the head and had the pulse oximeter probe placed on the great toe with a loop of the connecting cable taped over the leg in order to provide mechanical strain relief as the imaging

platform was moved in and out of the bore of the magnet. Afterwards, a superficial linear burn was found where the cable had been taped to the leg. In neither of these cases did there appear to be any failure of the pulse oximeter or its sensor.

The risk of burns due to pulse oximeter sensors and other metallic objects in proximity to patients during MRI has recently been reported to the radiology community.<sup>1-3</sup> However, of the (mostly older) published recommendations that we found regarding anesthesia for MRI, none has mentioned this particular hazard.<sup>4-8</sup>