

ducer valves are interchangeable on many introducers, we suggest that users of catheter introducer kits carefully examine the introducer ports and to use caution with those that are not self-sealing.

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Second-degree Atrioventricular Block after Methyl Methacrylate

DAVID L. BROWN, M.D.,* AND C. LEE PARMLEY, M.D.†

The cardiovascular events associated with application of methyl methacrylate (MMA) consist primarily of no change or a transient decrease in blood pressure.¹⁻³ The mechanism for this decrease is probably peripheral vasodilatation, caused by absorption of free MMA monomer into the systemic circulation.³ Cardiac arrhythmias have not been described following application of MMA, except in association with profound cardiovascular collapse.² However, we observed a second-degree atrioventricular block in close temporal relation to MMA application during two separate operative procedures involving one patient. A detailed electrophysiologic investigation after the second occurrence failed to demonstrate intrinsic conduction system disease.

REPORT OF A CASE

A 29-year-old, 84-kg woman with rheumatoid arthritis of six years duration was scheduled for a Wagner resurfacing procedure on her left hip. Her past medical history revealed idiopathic hypothyroidism, clinically euthyroid on replacement therapy. Her physical examination, with the exception of changes related to her arthritis, was unremarkable and her preoperative laboratory examinations including ECG, chest roentgenograph, serum electrolytes, and thyroid function studies were all within normal limits. Her medications included 10 mg prednisone per day; 0.2 mg sodium levothyroxine per day; 2.4-4.8 mg enteric-

coated aspirin per day in divided doses, and 500 mg naproxen twice daily. Diazepam, 15 mg, 30 cc sodium citrate orally, and 100 mg hydrocortisone succinate intramuscularly were given 90 minutes prior to induction of anesthesia. In the operating room, monitoring was established with precordial stethoscope, blood pressure cuff, and continuous electrocardiography. Thiopental, 4 mg/kg and 1 mg/kg succinylcholine were given iv, and the trachea was intubated; anesthesia was maintained with an inspired concentration of 70 per cent N₂O, 0.5 per cent enflurane, and the intravenous administration of 0.1 mg/kg diazepam and 4 µg/kg fentanyl.

Ninety minutes later, the acetabular portion of the joint prosthesis was seated with MMA in the standard fashion. Approximately five minutes later, a 2:1 second-degree atrioventricular block (fig. 1) with a ventricular rate of 30 beats/min appeared over a 30- to 45-second period and resolved spontaneously, though 0.6 mg atropine was administered 5 to 10 seconds before the dysrhythmia resolved. The arterial blood pressure did not change and analysis of arterial blood gases and serum electrolyte concentrations were within normal limits. No similar episode occurred with the application of the femoral portion of the prosthesis. The remaining operative course proceeded uneventfully.

One month after the initial procedure, a similar operation was performed on the contralateral hip. Her anesthetic management was nearly identical with that administered during her first operative procedure. Approximately five minutes after application of MMA for the acetabular portion of the joint prosthesis, a transient 10-second period of 2:1 atrioventricular block occurred (fig. 2) which resolved spontaneously. As before, analysis of arterial blood gases and serum electrolytes acutely were within normal limits. No conduction disturbance occurred with placement of the femoral portion of the prosthesis.

After the second occurrence of second-degree atrioventricular block, a cardiology consultation was obtained. The cardiac examination revealed no abnormality, with the exception of a grade II/VI systolic

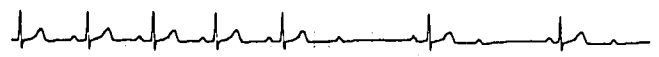


FIG. 1. Onset of atrioventricular block occurring during initial operative procedure.

* Chief Resident in Anesthesiology.

† Chief, Neurovascular Anesthesia Service.

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Address reprint requests to Dr. Brown.

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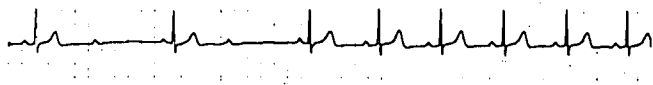


FIG. 2. Resolution of atrioventricular block during second operative procedure.

ejection murmur, thought to be a flow murmur related to mild anemia with a hemoglobin of 8.9 g/dl. Holter monitoring revealed no abnormalities over a 24-hour period, and HIS-bundle electrocardiography was without abnormality. Postoperatively, the patient had an uncomplicated course and was discharged from the hospital on the 15th postoperative day with a good surgical result.

DISCUSSION

Application of MMA has been associated with decreases in blood pressure² probably due to absorption of free MMA monomer into the systemic circulation.³ Some investigators have found little hemodynamic changes when monitoring with arterial and pulmonary artery catheters during MMA use.⁴ Wong *et al.* studied MMA administered to isolated profused rabbit hearts and found a dose-dependent depression of dp/dT which correlated with a depression of the spontaneous heart rate.⁵ However, no cardiac conduction defects have been related to MMA with premature ventricular contractions during profound cardiovascular collapse being the only reported dysrhythmia.² The appearance of second-degree atrioventricular block in our patient was temporally related to placement of the acetabular portion of the joint pro-

thesis during periods of stable hemodynamics on two separate occasions. The occurrence of atrioventricular block only with acetabular prosthesis placement may be related to the greater vascularity of the acetabular site as compared to the femoral head,¹ thus allowing greater access of free monomer to the systemic circulation.

This case documents the temporal association of the appearance of second-degree atrioventricular block with the placement of MMA in the highly vascular acetabulum during hip replacement procedures. This association occurred on two separate occasions in a patient free from cardiac disease. While the dysrhythmia we observed was transient and self-limited in our patient, a similar occurrence in a patient with significant cardiac disease might be of more clinical significance.

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Heart Rate and Blood Pressure Changes after ORG NC45 (Vecuronium) and Pancuronium during Halothane and Enflurane Anesthesia

SERGIO M. GREGORETTI, M.D.,* YUNG JAI SOHN, M.D.,† ROBERTO L. SIA, M.D.*

The new muscle relaxant Org NC45 is a monoquaternary homologue of pancuronium.¹ It has a shorter du-

ration of action and less cumulative and cardiovascular effects as compared to pancuronium and other currently used competitive neuromuscular blocking agents.²⁻⁵ To better confirm the cardiovascular effects of Org NC45, we monitored heart rate and arterial blood pressure after administration of an intubating dose of Org NC45 and pancuronium in patients anesthetized with either halothane or enflurane while surgical stimulation was absent.

MATERIALS AND METHODS

Thirty five patients (20 men and 15 women), 16 to 57 years old, in ASA class I, scheduled for elective ENT procedures, were studied. The mean age was 30.5 (± 12.2

* Senior Staff Anesthetist.

† Visiting Senior Scientist; Associate Professor, Departments of Anesthesia and Pharmacology, University of California, San Francisco. Received from the Research Group of the Departments of Anesthesiology and Clinical Pharmacology, University of Groningen, Oostersingel 59, 9713 EZ Groningen, The Netherlands. Accepted for publication October 28, 1981.

Address reprint requests to Dr. Gregoretti: Department of Anesthesiology, University Hospital, Oostersingel 59, 9713 EZ Groningen, The Netherlands.

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