

## Occlusive Vascular Disease

The following case report presented to the Committee on Clinical Anesthesia Study Commissions by Dr. Grete Teutsch, V.A. Hospital, Bronx, N. Y., indicates the need for other criteria than that of arterial blood pressure readings to determine adequacy of circulation.

### CASE REPORT

A 68 year old man with acute urinary retention due to prostatic hypertrophy was admitted to the hospital in mild distress. Arterial blood pressure was recorded as one beat at 70 mm. of mercury. No radial or carotid pulses could be felt.

The patient stated that he was seen by his own physician 3 weeks prior to admission because of difficulty and frequency of urination. At that time he was informed of his "strange" blood pressure and of the absence of his peripheral pulse. At all times the patient was ambulatory without experiencing any crampy pain or intermittent claudication.

A diagnosis of occlusive vascular disease was made, which was aggravated by peripheral vasospasm making it impossible to obtain peripheral pulsations.

Roentgenological examination of the chest was negative. No blood pressure or pulse could be obtained. Cardiac auscultation detected no cardiac abnormalities and an electrocardiogram which was normal revealed a sinus tachycardia of 112 beats per minute. Hemoglobin was 17.3 g. per 100 ml., hematocrit was 47 per cent, BUN was 14 and the fasting blood sugar was within normal limits. Urinalysis showed only albumin due to numerous white blood cells.

Seven and four years previously the patient had undergone a right and left inguinal hernioplasty, both times under spinal anesthesia. His blood pressure then was recorded as 140/80.

Preanesthetic medication consisting of Vistaril 75 mg. was injected intramuscularly a half hour prior to arrival in surgery. No arterial blood pressure could be obtained by auscultatory or palpation methods. No peripheral pulses could be felt except in the left posterior tibial artery, and the rate taken

there was the same as the apical rate of 92 beats per minute. An electrocardioscope revealed no changes.

Electrocardioscopy and a precordial stethoscope were used as monitors. 0.2 mg. of atropine sulphate was injected intravenously. Twenty minutes later, anesthesia was started by means of a slow intravenous drip of 0.4 per cent thiopental sodium. This was followed by cyclopropane anesthesia. Orotracheal intubation was performed following adequate relaxation secured by intravenous succinylcholine. Following intubation temporal pulse could be felt at a rate of 96 per minute and the arterial blood pressure in the brachial artery was 110/70.

Operation started 15 minutes after induction of anesthesia. During the next hour the patient's pulse and blood pressure remained stable at the previously recorded readings. During removal of the prostate there was an estimated sudden blood loss of 200 ml. At this time only a systolic beat at 90 mm. of mercury could be observed and remained so for the next hour of surgery. The temporal pulse remained unchanged. At the end of the operation, the patient's estimated blood loss was 650 ml. and a blood transfusion of 500 ml. of whole citrated blood was started. During the procedure he had received 500 ml. of 5 per cent dextrose in water, 80 mg. of sodium thiopental, cyclopropane anesthesia to a depth of second plane, and 360 mg. of a 0.2 per cent solution of succinylcholine.

The patient regained consciousness five minutes after anesthesia was discontinued. The preoperative circulatory status returned; a pulse could be felt only in the left posterior tibial artery and arterial blood pressure was limited to only an occasional systolic beat. This status continued for 10 days postoperatively. The patient was ambulatory on his second postoperative day and had an uneventful postoperative course.

### DISCUSSION

Absence of peripheral pulsations may be manifested in various syndromes. Outstanding, is Takayashu's disease also known as

pulseless disease, first described by Takayashu in Japan. Ask-Upmark<sup>1</sup> described 45 cases outside of Japan. This syndrome is characterized by absence of pulses in the upper extremities and in the carotids. This is the opposite of the manifestations that occur in atheromatous occlusion of the aorta at its bifurcation where pulsations cannot be felt in the lower extremities. Severe degrees of Takayashu's disease, as in the case reported, may involve all extremities.

Other conditions where peripheral pulsations may be absent include syphilitic involvement of the aorta; Raynaud's disease (where arteriolar spasm can cause color changes of blanching, redness or cyanosis); Buerger's disease, manifested by local phlebitis and involvement of larger arteries); and pronounced arteriosclerotic disease.

In the anesthetic management of a patient with pulseless disease both clinical judgment and use of special instrument interpretations are important. Clinical impressions of appearance of the patient, peripheral capillary refill time, temperature of the extremities, application of a precordial stethoscope and electrocardiograms, as well as accurate estimation of blood loss were used to great advantage in this case. Of interest in the course of management was the apparent release of a certain amount of vasospasm occasioned by general anesthesia so that an arterial blood pressure of 110/70 resulted after induction of general anesthesia. Vasospasm apparently returned when a certain amount of blood loss occurred suddenly.

Various important monitoring devices can be used in patients with pulseless disease. These include digital plethysmographs which record pulsation amplitudes in a finger or toe.<sup>2</sup> Electroencephalography would be valuable to indicate that circulation—at least of the central nervous system—remained adequate during the period of anesthesia. Other useful measurements would be monitoring of venous oxygen tension, venous pressure, and measurement of urinary output to determine renal circulation. The electrocardiogram is not an indication of effective cardiac output, although ST changes occur with hypoxia secondary to insufficient coronary perfusion. Direct arterial pressure readings by means of a needle or catheter inserted intra-arterially should *not* be used in a patient with severe vascular disease associated with vasospasm.

#### REFERENCES

1. Ask-Upmark, E.: *Acta Med. Scand.* **155**: 275, 1956.
2. Underwood, R. J.: Blood flow and blood pressure measurement in anesthesiology using the impedance plethysmograph. *Anesth. Analg.* **42**: 217, 1963.

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## Control of Abnormal Hypertensive Responses by Halothane

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In Hongkong between the years of 1957–1960 a series of 100 cases of Pott's disease in children were surgically treated by the anterior fusion method described by Hodgson and Stock in 1956<sup>1</sup> and others in 1960.<sup>2</sup>

The anesthetic technique employed in this

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series consisted of thiopental-nitrous oxide, curare and controlled respiration by means of a Rees' modified T-piece arrangement.<sup>3</sup>

Five cases showed an abnormal hypertensive response to anesthesia and surgery. Four were cases with dorsal involvement, two with paraplegia. These cases were approached and fused through the left chest. One case had a