Pseudohypertension in Hemodialyzed Arteriosclerotic Patients

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Fig. 1. Correlation between cuff and intra-arterial systolic (A, Δ) and diastolic (V, T) blood pressure in Osier-positive (Δ , V) and Osier-negative (A, $\blacktriangledown$) patients. Cuff pressures were consistently higher than intra-arterial pressure in Osier-positive patients.

Furthermore, the atherogenic index (total cholesterol minus HDL/HDL) was higher in Osier's maneuver-positive patients (3.9 ± 1.3 in 11 Osier's maneuver-positive subjects versus 2.4 ± 1.1 in 6 Osier's maneuver-negative subjects; $p < 0.05$ by Student's t test).

The large difference between the direct and indirect blood pressure values can be due to the increased rigidity of the arterial wall in HD-associated arteriosclerosis. With indirect blood pressure measurements, hard-walled arteries require greater pressure to collapse

Dear Sir,

One of our long-term hemodialyzed patients with diabetes mellitus presented on admission with a systolic blood pressure of 280 mm Hg, as determined by cuff sphygmo-manometer (indirect method). Simultaneous direct brachial artery cannulation blood pressure (direct method) showed a systolic blood pressure of 110 mm Hg. This remarkable discrepancy prompted us to investigate blood pressure in our maintenance hemodialysis (HD) hypertensive population.

We followed all recent American Heart Association recommendations [1], including using a 47×13 cm cuff and 24×13 cm bladder to avoid 'cuff hypertension'; also, we checked before starting our trial that there were no significant differences in each subject between left and right arm systolic blood pressure measurements. The cuff was strictly positioned 2 cm above the antecubital crease to obtain a similarly leveled complete compression of the brachial artery. All subjects had an upper arm circumference of not more than 27 cm, and all blood pressures were averages of 2 measurements.

Simultaneously, we measured each subject's blood pressure directly through a 17-G needle cannula in the opposite brachial artery.

Procedure of Osier's maneuver: Osier's maneuver was performed by inflating the blood pressure cuff above systolic blood pressure and carefully palpating the radial artery or brachial artery. Whenever either of these arteries remained clearly palpable, the patient was described as being Osier-positive. In contrast, when it collapsed and could not be palpated, the patient was described as being Osier-negative.

40 60 80 100 120 140 160 180 200 220 (mmHg) Direct Blood Pressure (Intra-arterial Pressure)

In 35% of the subjects, direct and indirect blood pressure measurements showed good correlation, and all of these patients had a negative result on Osier's maneuver (a simple test that identifies spurious hypertension due to excessively sclerotic arteries [2]1. The remaining 65% of subjects showed significantly greater (22 ± 11 mm Hg systolic, and 23 ± 13 mm Hg diastolic) blood pressure measurements by the indirect (cuff) method than by the direct (cannula) method, and all of these patients had positive Osier's maneuver (fig. 1).

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their lumens, resulting in higher blood pressure readings (pseudohypertension). Pseudo-hypertension has been noticed in essential hypertensives with severe atherosclerosis and in obese persons [2-5]. This spuriously elevated blood pressure can be easily differentiated by Osier's maneuver. Our present results show that Osier's maneuver can be applicable and useful in hemodialyzed patients with advanced atherosclerosis.

Our observations suggest that some hypertension diagnosed in patients with severe atherosclerosis may be an artifact of blood pressure measurement. Thus, physicians should be extra cautious in interpreting cuff-measured blood pressure elevations in dialysis patients.

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