THE INFLUENCE OF THE SOFT TISSUES OF THE ARM ON CLINICAL BLOOD-PRESSURE DETERMINATIONS

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A widespread impression exists that the degree of development of the musculature of the arm, or the size of the member, exercises considerable influence on blood-pressure readings made by the usual clinical methods, employing circular compression of the arm for the obliteration of the pulse. Von Recklinghausen's work demonstrated clearly that, with a sufficiently wide arm-piece, at least 12 cm., the latter factor could be entirely eliminated. Subsequently Müller and Blauel¹ made a critical study of this question, by comparison of clinical determinations with direct manometric measurements made in three patients during operation requiring the amputation of a hand. Their results showed an average reading with the broad cuff 9 to 10 mm. above the true systolic arterial pressure. They, of course, found very large errors with the narrow arm-piece and with Gärtner's method. Among their conclusions they state that, while the largest errors stand in direct relation to the width of the cuff, they are also partly dependent on the strength of the soft parts. This, so far as I know, is the only direct evidence for this contention that has yet been brought forward. Of evidence on the other side there is also a great paucity, the best being a case, reported by Hensen,² of marked muscular atrophy of the left side, the arm being entirely flaccid and of 22.5 circumference, while the right had a circumference of 25 cm. In this case the readings from the two sides were identical.

I desire to put on record two cases which, to me, demonstrate very clearly that such an influence of the soft parts does not exist, and that discrepancy between clinical blood-pressure estimations and direct manometric readings from the same limb, if found, must be explained either by resistance to compression of the arterial wall or by errors in the readings.

1. Müller and Blauel: Zur Kritik des Riva-Roccischen und Gärtnerschen Sphygmomanometers. *Deutsch. Arch. f. klin. Med.*, 1907, xci, 517.

2. Hensen (H.): Beitr. z. Physiologie und Pathologie des Blutdrucks. *Deutsch. Arch. f. klin. Med.*, 1900, lxxvii, 443.

A man of 57, with chronic nephritis and marked cardiac hypertrophy, had sustained a fracture of the right elbow at the age of 16, which had resulted in complete ankylosis; in spite of this he worked all his life as a carpenter, and had an enormously developed left arm which measured 30 cm. in diameter; the right arm was absolutely flaccid, with very little muscle, and measured 21.5 cm. Both systolic and diastolic readings were identical in the two arms, the pressure being 300 mm. systolic and 180 mm. diastolic.

The second patient was a lumberman of 50, who had been in the woods most of his life, and was both muscular and obese, carrying 331 pounds without dyspnea. He had a very mild diabetes. His arm measured 39 cm. and gave the surprisingly low systolic reading of 115 mm.

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