THE SUBJECTIVE METHOD FOR ESTIMATING BLOOD PRESSURE.*

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IN all observations for the clinical estimation of blood pressure it is generally agreed that the most accurate method is to employ a hollow pad to encircle the whole of some portion of a limb, to attach an air-pump to this, by means of which the pressure on the limb can be increased, and a manometer to measure the amount of pressure exercised. It is also generally agreed that the only forms of manometers which can be depended on for accuracy are those which are provided with a column of mercury. The others are not to be trusted unless frequently standardized by comparison with a mercurial instrument. For convenience the arm is the limb on which observations are generally made, and the best results are obtained when the compression armlet, measuring not less than 12 cm., is applied to the upper arm just above the elbow.

The pressure in the armlet having been raised sufficiently to obstruct completely the passage of blood through the brachial artery, this, by means of a control valve, can be gradually released, and the return of the blood into the arteries below the armlet can be determined in various ways. Those in common use are (1) the digital; (2) the auditory; (3) the visual.

1. The Digital Method.

By keeping the finger on the radial pulse the moment of the return of blood into the vessel can be observed with more or less accuracy. This indicates the moment when the power exercised by the heart is sufficient to overcome the pressure of the armlet, and is generally accepted as the systolic pressure. The digital method does not tell anything more, and is open to the objection that it is much influenced by the personal equation of the observer. This applies not only in comparing his observations with those of others, but also to his own, made on different occasions and under different conditions. I have little doubt, from experiments made on myself, that the acuity of the tactile sense is very much influenced by conditions of health and environment.

2. The Auditory Method.

This was first introduced by Korotkow of St. Petersburg in 1905, and made known in England by Dr. Oliver five years later. Instead of using the finger on the radial pulse, a stethoscope is applied to the brachial artery at the bend of the elbow; on the return of the blood beneath the armlet a distinct throb becomes audible, which gradually increases as the pressure lessens, and then gradually dies away and disappears on the complete relaxation of the constricting band. The auditory method gives not only the high point—the systolic pressure very definitely—but it also gives the low point; under normal conditions the point of maximum throb is midway between these points, and this is generally accepted to be the indication of diastolic pressure. It therefore gives three points. The finding of these is of the greatest importance, as I believe that alteration of the ratio between the systolic and diastolic points is the determining factor in the elucidation of those diseases which depend rather on disturbance of physiological conditions than on mechanical obstruction. Auscultation, then, has the advantage of giving more information, more accurately, and much less influenced by the personal equation. It has this disadvantage, that anatomical variations of the parts about the elbow may cause a throb to be heard even when there is no pressure at all. I have had one case, and Sir Lauder Brunton tells me he has had another, in which the low point was zero, which, of course, vitiates any calculation of the mean pressure.

3. The Visual Method.

Apart from the recording instruments, such as those designed by Erlanger and G. A. Gibson, which, though accurate, are unsuitable for clinical work, the determination of the blood's return by means of the sight depends on the agitation conveyed from the armlet to a metallic needle or a column of spirit or air. The maximal oscilla-

tion of the needle or column indicates diastolic pressure. The value of the observation depends very largely on the accuracy of the instrument and the amplitude of the oscillations. For demonstration purposes the visual method is most convenient, and Pachon's instrument, which I am using this afternoon, is perhaps the best. This instrument is supplied by the makers with too narrow an armlet designed for application to the forearm. The results from this are misleading; but if a Martin's 12 cm. armlet be used on the upper arm, substantially accurate results are obtained, coinciding with those by other methods, except that the needle is more sensitive than either the finger or the ear, and the record is 2 cm. too high for the high point and the same amount too low for the low point. In comparing methods a deduction must be made for this.

4. The Subjective Method.

Since my attention was called to the auscultatory method, I have always employed it, finding it more accurate and comprehensive than the digital. I found, however, in taking my own pressure that I was able, with equal accuracy, to estimate by my own sensations the moment when blood commences to return beneath the armlet, and that at which, the pressure being entirely relaxed, there is no obstruction to the circulation. The throb, which is audible through the stethoscope to the ear of the observer, is equally felt by the observed. With a little education the point of maximum throb can also be determined. This, which I call the *subjective method*, is, when attention is called to it, so obvious that I would not have ventured to bring it forward had I not been requested to make it public by Dr. George Oliver, to whom I communicated the observation at the beginning of last year. He introduced a note upon it into his paper in the *Quarterly Journal of Experimental Physiology* (March, 1911). He has since written to me saying that he has constantly made use of the method, and found it accurate and of much value. In estimating blood pressure I invariably make use of the auscultatory and subjective methods together, the one to correct the other. The subjective method has this advantage, that it is free from the small percentage of error due to anatomical variation, and this disadvantage, that with nervous and excitable people it is of no use at all.

WHOOPING-COUGH TREATED BY INTRAVENOUS INJECTIONS OF IODOFORM.

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FOR many years I have been anxious to try the effect of intravenous injections of iodoform in whooping-cough, but as one generally meets with the disease in young children with very small veins who lack the fortitude to submit to the operation, I have not been able to attempt it. Apart from its utility in pulmonary tubercle, it has proved of service with me in pneumonia and many obstinate cases of pulmonary catarrh which have resisted applications of iodine, blistering, and a great variety of cough mixtures. I was glad, therefore, of the opportunity to apply it in a lad of 15, just returned from a public school where the disease was prevalent. He had the usual malaise, the suffused face and eyes on coughing; his temperature was 100°, pulse 100, and respirations 26. The whoop had developed. He could give me no idea of the number of coughs in the day, further than that they were frequent and his nights were very broken by coughing. There was very little expectoration, but on auscultating the chest catarrhal sounds were distinctly audible over both lungs from apex to base. There were no other physical signs of lung mischief. The temperature (taken orally three times a day) was normal on the third day. The whoop disappeared from the cough on the fourth day. He slept all night without a cough on the fifth day. Pulse and respirations became normal, and the number of coughs fell from twenty (urgent and prolonged) to four (simple and short) in the day, on the tenth day.

On the first two days the coughing immediately after the injection was pretty severe, but every day thereafter

* Paper read before the Oxford and Reading Branch of the British Medical Association, on July 13th, 1912.