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.

BY

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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

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it diminished till, on the tenth day, no cough followed the injection.

A, Injection of CHLs, gr. j. B, Injection of CHLs, gr. iss.

Pari passu with these changes there was a progressive sense of betterment and return to health. He felt less exhausted after the cough and his appetite improved. As I have said, the application of this treatment, even by the most dextrous, is quite impossible in children. Their veins, as a rule, are too small, even for the finest needles made, and are frequently buried in fat. Besides, very few young children could be coaxed into submitting to the daily prick of a needle, after having a handkerchief tourniquet applied to the arm, or hold the arm steady enough even if they would.

During the past nine years, since I first published this method for treating pulmonary tubercle, I have heard indirectly of alarming symptoms being attributed to the intravenous injection of iodoform. It is rather extraordinary that I should have practised it without intermission for nearly twelve years, and in that time given thousand of injections and never once met with anything worse than a local thrombosis in my earlier experience, which was due to my own want of skill. As iodoform is a power for good in such a complex disease as pulmonary tubercle,¹ and is apparently potent in pneumonia, persistent pulmonary catarrh, and whooping-cough, it is desirable that the minds of the profession should be disabused on this point. Even in advanced pulmonary tuberculosis patients can stand the continued exhibition of iodoform intravenously without any outward effect. I have shown what it can do in an adolescent with whooping-cough, and I have no hesitation in saying that an adult or elderly person who contracts the disease will suffer infinitely less from the daily dose of iodoform for ten days or a fortnight (should it be necessary so long) than their hearts and blood vessels will suffer from the strain of repeated prolonged coughing.

In this case the veins were large and well filled, and as I knew the course of treatment if successful would be short, I used 1 grain of iodoform dissolved in 10 minims of methylated ether, specific gravity 0.720, alone. In a paper in the BRITISH MEDICAL JOURNAL for 1905 I advised the addition of as much as 40 per cent. of liquid paraffin in the treatment of pulmonary tubercle, but I now think the less one can work with the better. There is no doubt that the large percentage obviates all risk of iodoform blocking in the needle or jamming the piston of the syringe, and it also greatly diminishes the irritating effect of the ether on the lining membrane of the veins. Where the veins are small, few in number, or badly filled with blood, it must be used in proportions varying from 2½ to 20 per cent., but it undoubtedly aggravates the coughing at the time, and is more apt to cause breathlessness afterwards than iodoform in ether alone, or with only a very small percentage of paraffin. In all the years I have used iodoform intravenously I have seldom met with any symptoms suggestive of idiosyncrasy, and certainly none pointing to anaphylaxis. Dr. Emery, in his paper on anaphylaxis at the Annual Meeting of the British Medical Association, 1911, alluded to this, not I think as a personal observation, but as having been recorded by Brucks and Klausner.² It is alleged that the shock which sometimes accompanies acute attacks of "serum disease" can be entirely controlled by the administration of ether as a general anaesthetic. Assuming Brucks and Klausner to be right, is it permissible to

believe that the ether in the iodoform solution prevents this? I would also add that I have never met with symptoms of iodoform poisoning.

My object in publishing notes of this case of whooping-cough is not so much to present what looks like a specific treatment (for, as I have said, its application is circumscribed to adolescents and adults) as to direct attention to the general applicability of iodoform administered intravenously in a variety of pulmonary infections occasioned by different specific infections. Nor is its beneficial effect confined to the lungs alone. In a letter I received last month from Dr. W. Johnson Calder, of Rayton, Transvaal, he says: "I am convinced that not only is the injection of use in phthisis, but in pneumonia, asthma, and leprosy, as well as syphilis. This has been my observation, and you should note it."

In these days of vaccine and serum therapy, when a specific infection, we are led to believe by some, can only be controlled by a particular vaccine or serum, is it not possible to think that chemotherapy may after all have been thrown over too soon? In the field of established and active disease no inconsiderable successes may yet await it.

REFERENCES.

¹ Dr. Bain, *Glasgow Medical Journal*, 1909; Dr. Crofton, *BRITISH MEDICAL JOURNAL*, 1912. ² *Berl. klin. Woch.*, 1910; *Munchener*, 1910.

THE CONTAGIOUSNESS OF LEPROSY.

BY

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As the perennial discussion of the contagiousness of leprosy appears to have started again, as seen from the correspondence in your issues of March 23rd and 30th and April 20th, I have thought it might be interesting if I gave the history of various leper families resident in this Republic of Paraguay.

I daresay medical men resident in leper countries are as a rule so thoroughly convinced of the contagiousness of leprosy that they do not think it worth while to write to contradict statements made to the contrary. After an experience of twelve years in a leper country I am able, from personal observation, to support the view of your correspondent of April 20th, to the effect that "leprosy is not hereditary," and that "leprosy is contagious." Whether it is spread (as he says) wholly and solely by contagion, immediate or mediate, or whether cases may arise *de novo* from eating fish or other foods badly cured, is a difficult matter to decide. My own idea of the question will be gathered from what follows.

It is almost certain that for the rapid spread of leprosy in a country certain favourable conditions are necessary. It may be, as the advocates of the fish theory hold, that the conditions necessary are those of diet—that leprosy has been most prevalent when a certain kind of diet has been in general use.

At the present time in Paraguay leprosy is spreading like wildfire. During the last ten years the number of lepers has doubled—perhaps even trebled. In that time there has been no change in the mode of living of the people as regards their diet.

At the present time leprosy is far more contagious in Paraguay than tuberculous disease of the lungs. I could give various instances of phthisical patients who have lived in the midst of their families in their little windowless huts, have expectorated over floor and walls or wherever convenient, and yet their families, husbands or wives or children, have not contracted the disease as far as can be seen. A man in a house not a square from here is in the last stages of phthisis. His wife and two children have slept in the same room and eaten with the patient now for six years. Not one of the family shows a sign of phthisis. Signs may appear later; but what I wish to show is that tuberculosis has not found a suitable home in this country such as it has in Great Britain. Far otherwise is it with leprosy.

Ten years ago I first saw A. M. He had a black patch covering the place where his nose had been. He was in the last stage of leprosy. Two years later I was called to attend his son, who had been stabbed in the chest. The leper father was squatting in a corner of the hut. A year later he died.