adversely affected by operation. Finally, there has been no mortality, and no complication of a nature to cause alarm.

REFERENCE.

¹ Hunterian Lecture, *British Journal of Surgery*, July, 1918. *Transactions of the Odontological Section, Royal Society of Medicine*, March, 1918.

PELVIC MEASUREMENT IN ANTE-NATAL CLINICS.

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THE following notes have been written in the hope that they will prove of use to those engaged in frequent and routine examination of the pregnant woman. One of the first objects of the work in the ante-natal clinics is the measurement of the pelvis and the recognition of contraction in order that obstetric disasters may be anticipated, and therefore prevented.

The importance of complete pelvimetry in every primigravida and all multigravidae with a history of instrumental or difficult delivery cannot be overestimated, for during the course of such routine examination it is surprising to note that a relatively large number of women show degrees of pelvic contraction which are slight, but sufficient to cause a difficult labour. The grosser degrees of contraction are usually recognized easily, and adequate prophylaxis arranged, but so much may be done for the less marked cases by accurate recognition followed by timely induction of labour, perhaps only a week or two before term, but yet long enough to prevent the risk of fetal death during a tedious delivery.

If measurement of the pelvis were a certain means of knowing the size of the brim the examination and its judgement would present little difficulty, but, unfortunately, in the slighter degrees of contraction the measurements often give no true information, and if reliance be placed upon these figures, and no further examination be made of the manner in which the head is behaving in or above the brim, there may be surprise at the time of labour that a difficult forceps delivery is required. The converse also is true—that a pelvis apparently, by external measurements, contracted is found to offer no impediment to the subsequent passage of the head.

The usual measurements made during an ordinary examination are three, together with an attempt, generally unsuccessful, to estimate a fourth. Of the three two concern the false pelvis—namely, the interspinous and the intercrystal diameters; but these measurements are of little value—in fact, scarcely worth the trouble of recording except when altered to a marked degree, in which case other diameters give more information.

The interspinous is described in the books as 10 in. (25 cm.), but it seldom reaches this figure, and may vary from 8½ in. (21 cm.) to 10 in. (25 cm.) in a pelvis with a basin normal in size. It is most commonly a little over 9 in. (22.5 cm.). The intercrystal is a little more constant, between 10½ in. (26 cm.) and 11 in. (27.5 cm.), and diminution of this diameter may be of more consequence as indicating a contraction of the transverse diameter of the brim, and therefore a generally contracted pelvis. It is probable that if ½ in. (1.25 cm.) be deducted from this and the resultant figure halved, a fairly correct measurement of the transverse diameter of the brim is obtained. Much importance has been attributed to a diminution of the difference between these two diameters as indicating a flat pelvis. This is true for severe degrees of flattening, but in the great majority of slightly flattened pelvis there is no alteration whatever; in fact, the normal difference of 1 in. (2.5 cm.) may be increased.

The more important measurements are those of the true pelvis, and of these the external conjugate probably gives the most information. This should properly be measured from the depression below the tip of the last lumbar spine to the upper border of the symphysis. An error is often made in obtaining this diameter because the anterior limb of the pelvimeter is placed upon the anterior surface of the pubes instead of being carried well on to the upper border, so that the tip of the instrument is flush with the posterior surface of the symphysis, hence the diameter is usually made greater than it should be. It is

often stated that the external conjugate is unimportant because the amount of fat is variable, and the figure obtained therefore unreliable. But fat does not tend to a great extent to be collected over bony points like the vertebral spines, while the difficulty of excess of fat over the symphysis can be overcome by pressing in the pelvimeter more deeply. In normal pelvis this diameter is found to be remarkably constant at 7½ in. (18.25 cm.). In some cases, however, there is a variation, due not so much to fat as to a varying thickness of the mass of bone between the tip of the spine and the sacral promontory. That this is probably so is shown by the fact that a normally sized head will sometimes engage deeply in the brim of a pelvis whose external conjugate measures only 7 in. (17.5 cm.), or even 6¾ in. (17.25 cm.). In these cases the contraction of the diameter is probably due to diminution in the thickness of the vertebra.

An external conjugate of 7½ in. (17.75 cm.) indicates scarcely any appreciable contraction of the true conjugate, and usually the engagement of the head is normal, but if it be diminished to 7 in. (17.5 cm.) it is frequently observed that the head remains higher than it should, and labour at term is unduly prolonged. In some of these patients there is definite non-engagement of the head followed by a protracted delivery. If the reading reaches only 6¾ in. (17.25 cm.), almost certainly will there be found non-engagement of the head.

The posterior interspinous diameter, normally 4½ to 5 in. (11.25 to 12.5 cm.), should be measured from the two small depressions immediately external to the tips of the posterior superior spines, as this diameter almost exactly corresponds to the maximum width of the sacrum in the circle of the pelvic brim, which makes it a useful index of sacral development. Diminution in this diameter occurs in small degrees of generally contracted pelvis, because the sacrum is of a smaller model than normal, and also in the severer cases of flat pelvis because the sacrum is sunk more deeply between the iliac bones, thus allowing the posterior superior spines to become approximated by the inward pull of the sacro-iliac ligaments.

The external conjugate and the posterior interspinous diameters should be considered together when judging a pelvis. Small contraction of both will usually indicate a slight degree of general contraction, while a diminution of the former and the latter unaltered points to a small amount of flattening.

In the large number of pelvis undergoing routine examination it is comparatively seldom that the diagonal conjugate can be estimated owing to the inaccessibility of the promontory. No measurement of this diameter is trustworthy unless the finger can just pass the promontory, for, unless this can be done, one is never sure that the highest point is reached. Few fingers can reach more than 4½ in. (10.5 cm.). It is usual to subtract ½ in. (1.25 cm.) from the diagonal conjugate to obtain the true conjugate, but if the promontory be felt to project far forward, indicating a steep inclination of the brim to the horizontal, at least ¾ in. (2 cm.) should be deducted. In addition to an attempt to feel the promontory, the finger should be swept round the pelvic cavity to gain a rough idea of the size of the basin and the width of the subpubic angle.

But in spite of the most exact pelvimetry, slight degrees of contraction will often remain undetected unless the extent of the engagement of the fetal head is carefully examined. As Dr. Hubert Roberts says: "The best callipers is the baby's head." In the normal primigravida the head is usually deeply engaged in the brim, especially when near term, but sometimes it is high up. For this there may be obvious reasons, such as a full bladder and rectum, while pelvic contraction accounts for others, but there is a residue which do not admit of a ready explanation. When, however, the head can be pressed down into the brim, the pelvis is either normal, or, if contracted, the head has not yet reached such a size as to be incommoded by the diminished diameters. But if the head cannot easily be depressed by firm pressure this is usually due to contraction or to extension, the latter condition being easily diagnosed. The facility with which it is possible to press down the head is a most important clinical estimate, and should be observed with care.

It is usual to recognize three degrees of position of the head with reference to the brim—it may be *floating* (movable above the brim), *engaging* (movable in the brim),

or engaged. If the head is found to be floating or too high, it is next necessary to attempt to force it down into the brim, and thus gain an idea of any disproportion that may exist between the head and the brim. This is best done by standing so as to face the woman and placing the fingers of both hands flat upon the head, and forcing it firmly backwards and downwards. By this manoeuvre one can recognize three degrees of ease in causing descent. Firstly, the head may be easily depressed deeply into the pelvis; secondly, it may be possible to depress it a slight distance, after which the sensation obtained is as if one were pressing the head on a mass of rubber; in other words, there is an impression of resiliency; thirdly, it is impossible to cause any descent at all. In many cases there is doubt as to whether the head can be made to descend, because small amounts of movement can scarcely be appreciated by the abdominal hand. If this be so, it is necessary to examine by Munro Kerr's method. The woman lies upon her back, and the finger of the right hand is held rigidly in the vagina so as just to touch the vertex if this is low enough to reach, while the left hand grasps the head and attempts forcibly to press it down. By this method a degree of descent too small to be recognizable by the abdominal hand alone can easily be appreciated by the vaginal finger. But the existence of mere descent is not enough. When the head is very high it can be pushed down on to the brim, but often not into the brim, which is the condition we aim at producing.

Having, then, made a full examination of the pelvis as above, the important point is the question of treatment for patients with pelvic contraction. The indications will be the position of the fetal head in relation to the brim, and the period of gestation.

Firstly, even if the measurements are contracted, but the head week by week during the last months is found to be engaged, or can easily be made to engage, then induction of premature labour should be withheld; but, if the head is found not to be engaged, or only engaging, repeated attempts should be made to cause descent as described above. Usually, from the thirtieth to the thirty-sixth weeks there is no difficulty in this, but sooner or later the manoeuvre will become more and more difficult until finally there is a doubt as to whether the head can be pushed down at all. If labour be induced at this time it will generally be found that it is unnecessarily easy, while the child will have been deprived perhaps of a further week of gestation. The best procedure is to wait until the head can just *not* be pressed down, and then to send the patient for induction immediately. In the majority of cases the labour will not be too difficult, and the child will have been given the maximum period of intrauterine life. The usual tendency is to induce labour too soon, in the fear that the head is too large, with the result that labour is much quicker than was expected.

In those cases where the head remains floating and incapable of engagement and descent before the thirty-sixth week, it is a question whether Caesarean section at term is not better treatment than induction of premature labour, and this alternative should be put before the patient.

In conclusion, I would urge ante-natal medical officers to look carefully for the slightest degrees of pelvic contraction, as it is these cases which are apt to go unrecognized and result in tedious labours at term, with a high rate of morbidity and a greater risk to the child's life.

PRIMARY SARCOMA OF THE PROSTATE: RAPID GROWTH FOLLOWING INJURY.

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Cases of this rare disease are worthy of being recorded. The infrequency of its occurrence is demonstrated by the circumstance that out of the immense number of cases seen at the Hôpital Necker, in Paris, only one sarcoma of the prostate has been discovered. The disease was first described by Stafford in 1839, and in 1858 Thompson was able to discover only 6 cases; in 1902, by the research of Burckhardt, 24 cases in all were collected.

The case about to be described is of interest from a surgical point of view because of the disease, and from a legal aspect on account of the injury. The patient's wife obtained compensation in the Sheriff Court of Lanarkshire.

W. B., aged 35, was admitted to the Glasgow Royal Infirmary under my care on May 2nd, 1917. He then told me that prior to the accident on March 10th he enjoyed good health. On that day by a fall while he was at work in a pit he received an injury to the perineum and testicles. This caused difficulty in passing urine and slight bleeding from the urethra. He was treated by his own doctor till the beginning of May.

When admitted to the infirmary he was suffering from severe pain in the region of the bladder, and retention of urine which demanded the use of the catheter; the urine which was drawn off was alkaline, containing some blood, pus, and triple phosphates. He also showed symptoms of septic absorption. Rectal examination showed a round, smooth, soft enlargement of the prostate.

As the haematuria was severe, and the general symptoms alarming, I performed suprapubic cystostomy on May 9th, permitting a large quantity of decomposing urine to escape, while a considerable blood clot was also removed. This done the prostate was found to be occupied by a soft fungating growth which could be traced into a small cavity in the prostate. It had well-defined walls; the opening admitted my forefinger, and with it the tumour mass was easily removed; afterwards the cavity was curetted.

A portion of the growth was examined by Professor Teacher, and proved to be a round-celled sarcoma. A large drainage tube was inserted into the bladder, and free drainage established. This gave complete relief from pain, and the patient's general condition improved, but, although less profuse, the haematuria continued, and within a fortnight, when a second exploration was made, the tumour was found to have recurred, and to be of greater bulk than when the patient was admitted. As in the circumstances I did not consider myself justified in recommending cystectomy, he left the hospital at his own request on July 3rd, when the bladder was almost completely filled with tumour.

The case was a hopeless one, and by performing a radical operation the legal aspects would have been seriously complicated, my opinion being that prior to the accident there was a small encapsuled round-celled sarcoma in the prostate, which, if uninjured, would probably have remained quiescent for a long time. The fall caused a contusion of the perineum and the scrotum, showing that considerable force had been exerted on the parts. This force by being conveyed upwards would readily cause rupture of the capsule of a soft sarcoma in the prostate, but evidently was not sufficient to produce a rent in the mucous membrane of the bladder, hence no free bleeding was observed immediately after the accident. The capsule of the sarcoma being ruptured by the blow the tumour extended rapidly, and at the beginning of May penetrated the mucous membrane, and so bursting into the cavity of the bladder caused profuse bleeding with retention of urine.

Surgical treatment gave relief to the immediate symptoms, but the tumour, which was small when first noticed, rapidly increased while the patient was under observation, and within three months it practically filled the bladder. Soon afterwards the patient died from haemorrhage and exhaustion. A claim was made under the Workmen's Compensation Act and full compensation was awarded.

A point of clinical and pathological interest in this case is the effect of injury in inducing rapid extension of the sarcoma, and in this connexion I may quote a passage from *Tumours Innocent and Malignant*, by Sir John Bland-Sutton,¹ as applied to sarcoma of the mamma, where such tumours are more frequently met with than in the prostate:

In regard to sarcoma of the breast, there is a definite opinion held by experienced surgeons to the effect that there are many carefully observed and thoroughly reported cases in which primary sarcoma of the breast has quickly supervened on a single intensive injury. The sarcomatous nature of the tumours has been ascertained by a microscopic examination at the hands of a competent pathologist, and their malignant nature has been confirmed by the early death of the individual. It is undeniable that a single intensive blow or knock on the breast may be occasionally followed by a sarcomatous tumour.

Injury is now generally admitted by surgeons to be an etiological factor in carcinomata and sarcomata, but it is difficult to say what exact relation such injuries bear to the genesis of malignant neoplasms. The case here described appears to me to throw some light on the subject. Here we have a man enjoying what appeared to be perfect health; he receives a severe blow on the perineum, and two months afterwards I find the bladder occupied by a large fungating sarcoma, which protruded from a cavity in the prostate, the walls of which were well defined. That there was a well defined cavity showed that the growth had been encysted, and that it was not an infiltrating tumour to begin with. If the tumour had been caused directly by the injury the growth would have been diffuse, no