infection is the precipitating factor. Intramuscular penicillin, combined where indicated, with inhalation therapy should be commenced at once if chest infection is felt to be a contributory factor in cardiac breakdown. Meanwhile investigations should be started and modification of treatment may be made as indicated. The effective treatment of the lung lesion associated with the correct approach to the heart condition may lead to dramatic improvement in what may otherwise seem to be a hopeless problem.

Conclusions

1. Dogmatism must be avoided when con-

sidering the use of antibiotics in non-tuberculous disease of the chest.

2. Bacteriological investigation and sensitivity tests of organisms obtained are essential.

3. Blunderbuss therapy must not be used.

4. Newly discovered and comparatively untested antibiotics must not easily replace tried remedies.

5. The wider aspects of aetiology such as social factors must be evaluated.

6. The important part that lung infection plays in heart failure has been touched upon.

I should like to thank my colleagues, and many others in the hospital for their constant cooperation and help with these problems.

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THE CLINICAL ASSESSMENT OF DISPROPORTION *

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Attention has been devoted during recent years to radiological methods of assessment of the sizes of the maternal pelvis and foetal head and much has been achieved. The greatest strides have been made in the estimation of the size of the pelvis, but progress has not been limited to actual measurement of the bony structures. There is now a better understanding of the architecture of the pelvis—of its variations in shape as well as in size—and of the significance of these variations. So much thought has, in fact, been directed into these comparatively new channels that many of the methods of clinical assessment previously in use seem to have been forgotten or to have fallen largely into disuse. For this reason the time now seems opportune to re-consider some of the clinical methods available for estimating the relative sizes of the foetal head and the maternal pelvis. It is, after all, upon these methods that we must rely to select those cases which require fuller investigation and ultimately, in conjunction with

other findings, to decide upon the further management of the case. The words of the pious 18th century German midwife, Justine Siegemundin—'All I do depends on God's help and on the skilful motions of my hands'—have a particular application to this type of case.

Some indication of possible difficulty at the time of the confinement may be discovered during the course of the routine antenatal investigation of a case. The patient may be of small stature, she may have an obvious limp, occasionally due to ankylosis of the hip, or she may show gross deformities of the long bones or spine and, for instance, there may be obvious rachitic manifestations. In giving the medical or surgical history she may bring forward an account of fractures, tumours or diseases of the pelvic bones or spine, or tumours of the pelvic organs. The previous obstetric history may suggest the possibility of recurrent complications arising in the approaching confinement. There may have been a prolonged or complicated labour, a difficult delivery or Caesarean section, maternal trauma or a stillborn or injured child, possibly of large size, on a previous occasion. In all such cases every effort

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should be made to elicit as much information as possible about the previous confinement. This applies especially to confirmation of the patient's story, and a report upon the efficiency of the uterine contractions and the immediate cause of any difficulties which may have arisen. Further information should be obtained whenever possible from the doctor in attendance at the time of this complicated labour.

A general examination is necessary in all cases in early pregnancy, and abdominal palpation should be carried out repeatedly, especially during the last six weeks of pregnancy, the bladder and rectum being empty. The height of the uterus may be checked by sinking the edge of the left hand into the abdominal wall above the fundus. The presentation, position, attitude and, to a lesser extent, the size of the foetus can usually be determined with a reasonable degree of accuracy by Pawlik's grip followed by the fundal and umbilical grips carried out in the standard textbook manner. As a supplementary method of examination, ballotting the foetus by rocking the hand with the finger and thumb outstretched, as in Pawlik's grip, in different parts of the abdomen may be helpful especially for identifying the foetal back and, when carried out with the left hand, for locating the foetal head when it lies in the uterine fundus. It is unhelpful to feel for the foetal parts by a rotatory movement of the finger-tips on the uterine wall. This tends to rub up a contraction of the uterus and so to mask the underlying foetal parts. It therefore makes identification still more difficult. In applying Pawlik's grip and the umbilical and fundal grips the method of ballottement should be used. Pawlik's grip should be carried out by a side to side rocking movement of the hand and wrist from the forearm, tapping the foetal head alternately with the thumb and the fingers rather than by firmly grasping the foetal head as it lies in the lower uterine segment, a procedure which tends to cause unnecessary pain. The estimation of the size of the foetus is largely based upon the assessment of the size of the foetal head, but a rough estimate of the relative bulk of foetal substance and liquor amnii, the height of the breech in the uterus considered together with the degree of engagement of the head and the apparent size of the various foetal parts provide valuable auxiliary information. The appraisal of the high foetal head is, however, of first importance. A general impression of its size can be obtained from Pawlik's grip after the head has been flexed. This head flexion is effected by pressing on the foetal breech at the uterine fundus with the left hand to arch the child's back towards the uterine wall and at the same time tilting the head with the right hand. A better assessment of the size of the head can be

made by this method than by the alternative 'pelvic grip' with the hands laid on either side of the midline in the supra-pubic region with the fingers pointing towards the pubes and palpating the foetal head bimanually as it lies above the pelvic brim. This is as one would expect. It is much easier to judge the size of a ball or an orange by holding it in one hand than by rolling it between the fingers of the two hands.

Next the flexed foetal head is depressed downwards and backwards into the pelvic brim by the examining hand to gain some impression of the ease with which it can be fitted into the pelvis. It is important that the sagittal suture should be directed into the axis of the brim and not tilted to front or back. It is sometimes recommended that the head should be fitted into the brim with the patient sitting. This, however, by tilting the pelvic brim may give fallacious and over-optimistic impressions. In fitting the head into the pelvic brim, not only is the amount of descent noticed but the degree of over-riding of the pubes by the skull is estimated by the fingers of the right hand. There should normally be a step-up from the foetal head on to the pubes and not vice versa, when the head is pressed back against the spine.

It is frequently stated that the foetal head engages in the pelvic brim in the primigravida between the 34th and 36th weeks and in the multigravida shortly before the onset of labour. While it is true that lightening, and so engagement of the head, usually occurs earlier in the primigravida than in the multigravida, it is not unusual, even under normal conditions, to find the head high at the 36th week or even later in either case. If the head has not completely engaged in the pelvic cavity by the 36th week of pregnancy at latest, in either a primigravida or a multigravida, a vaginal examination is essential. If the head is engaging, that is if part of the head has entered the pelvic cavity although the greatest engaging diameter has not yet passed the brim, the examination may be deferred for a further two weeks. If at the 38th week the head is not completely engaged, vaginal examination must then be carried out. Repeated abdominal and, when necessary, vaginal examinations will minimize the risk of any case of disproportion being overlooked and will make the ultimate findings more reliable.

It is often recommended that the external pelvic measurements should be taken as routine after the abdomen has been palpated. I personally think that if these measurements are taken and the inter-spinous and inter-cristal diameters and the external conjugate are found to be normal one tends to be lulled into a false sense of security and to assume that the pelvis is normal. Yet it is not unusual to find these measurements within normal

limits in cases of pelvic contraction. On the other hand, if the measurements are subnormal the consequences are not likely to be so serious as a more detailed examination will almost certainly be carried out. The pelvic cavity, however, will not necessarily be found to be deformed. As, in my opinion, these measurements are unreliable in indicating the presence or absence of pelvic deformity and may prove misleading, I do not take them during the course of routine examination of the ante-natal case.

The pelvic outlet is reasonably accessible, the chief difficulties in the way of assessment of its size being due to the thickness of the superficial covering tissues. The width of the subpubic angle is of considerable importance and the angle between the pubic rami should, therefore, be carefully investigated. It is normally slightly more or less than a right angle. If it is more acute it is probable that the ischial tuberosities are closer together than usual and that transverse contraction of the bony outlet is present. Apart from the risk of arrest of the foetal head during the second stage of labour this narrowing of the sub-pubic angle may so limit the available space in the anterior segment of the pelvic outlet that the greater part of the head must be born behind the ischial tuberosities through the posterior part of the outlet. This is liable to cause extensive and even complete laceration of the perineum and to inflict considerable damage upon the pelvic floor. The length of the inter-ischial diameter between the medial borders of the ischial tuberosities may be measured by a pelvimeter or by the clenched fist. Reliable measurement by the pelvimeter is frequently difficult owing to the thickness of the subcutaneous fat in this region, and the measurement of this diameter, normally about 4 in., indicates only its approximate length. As a rough guide to the space available between the ischial tuberosities the introduction of the knuckles of the right hand at the interphalangeal joints into the inter-ischial space, at the level of the anus, can be tried. If the pelvic outlet is normal, four knuckles should readily pass between the ischial tuberosities, although this measurement is also approximate in view of the inconstant thickness of the subcutaneous fat. Some observers stress the importance of the measurement of the posterior sagittal diameter taken from the mid-point of the inter-ischial line to the tip of the sacrum, but I feel that in cases of doubt there are more satisfactory methods for confirming the clinical findings than by taking such an arbitrary measurement, even if it is considered in conjunction with the transverse diameter.

Vaginal examination of the pelvis, carried out with the patient lying on her back with her knees

drawn up and widely separated, is necessary in a high proportion of all primigravidae and multi-gravidae. It is essential in all cases in which the greatest diameter of the foetal head has not passed through the pelvic brim before the 36th or at latest the 38th week of pregnancy. This applies whether or not the patient has had previous confinements. Rather than take any chance of error when not absolutely certain of the diagnosis after abdominal palpation, it would be safer to examine every patient vaginally. The cause of the high head may be a tonic condition of a well-developed muscular pelvic floor or an atonic condition of the uterine or abdominal muscles. It may be due to deflexion of the head or posterior position of the occiput, to the large size of the foetal head associated with a big foetus or foetal abnormality, to tumours in the pelvis or placenta praevia, or to tumours, fractures or deformities of the pelvic bones.

The most important of these conditions which may keep the head high are, from a practical point of view, occipito-posterior position often with incomplete head flexion, a large foetus, pelvic contraction or a relatively large foetus with a relatively small pelvis. Internal pelvic examination is also necessary whenever a malpresentation has been found or there is a history of previous complicated or unsatisfactory confinement. A history of previous normal confinement does not mean that a subsequent labour will necessarily be uncomplicated. The foetus may be larger, the presentation and position may be different, the uterine action may be less satisfactory and it is even possible that the pelvis may be smaller. If uterine fibroids are palpable through the abdominal wall vaginal examination is necessary to exclude the presence of pelvic fibroids which might obstruct labour, these tumours frequently being multiple.

Vaginal examination should be carried out at or after the 36th week of pregnancy, when its purpose is to estimate the sizes of the pelvis and foetal head and the relative proportion between the two. At this time the soft tissues are relaxed and reasonably accurate estimations are possible with minimal discomfort to the patient. If the estimation is made during the early months of pregnancy, owing to the inelasticity of the soft tissues, the size of the pelvis tends to be under-estimated. On introducing the fingers into the vagina, after assessing the sub-pubic angle and pelvic outlet, the walls of the pelvic cavity are palpated and an impression of normality, roominess or of restricted space may be gained. The degree of separation of the pubes may be assessed by grasping the symphysis between the index finger in the vagina and the thumb over the mons veneris. The ischial spines may then be palpated and if they are unduly

prominent the fact should be noted, especially in cases of occipito-posterior position. At the same time the size of the sciatic notch should be checked as, if this is unduly small, the pelvis may be deformed. Any change from the normal gradual curve of the sacrum either in the direction of straightening or excessive angulation should not be overlooked. Excessive mobility of the sacrum should be noted and the pliability of the sacrococcygeal joint confirmed.

Measurement of the diagonal conjugate from the lower border of the symphysis pubis to the promontory of the sacrum is now carried out. The index and second fingers of the right hand are passed into the vagina and advanced towards the sacral promontory. If a steady pressure is maintained on the perineum with the flexed free fingers, in all but the most unco-operative patient it should be possible to reach the promontory with the tip of the middle finger in a normal but not unusually large pelvis. The middle finger is pressed steadily against the promontory and the position of the lower border of the symphysis pubis or the sub-pubic ligament is marked, as it lies near to the metacarpo-phalangeal joint of the right index finger, with the nail of the left index finger. The right hand is now withdrawn and the distance from this point to the tip of the middle finger is measured with a rule or pelvimeter to obtain the diagonal conjugate. If, with the patient recumbent the pubes are horizontal or parallel with the bed, $\frac{3}{4}$ in. and if vertical $\frac{1}{2}$ in. is deducted to give the true conjugate. This is probably the most important single diameter of the pelvis.

If the promontory is found to be of the 'overhanging' type projecting well forward over the pelvic brim the true conjugate measured in the manner described tends to be over-estimated. Not less than $\frac{3}{4}$ in. must, therefore, be deducted in such cases. It is important that a false promontory formed at the junction of the bodies of the first and second sacral vertebrae should not be mistaken for the true promontory at the lumbosacral junction. This mistake is unlikely to be made if the sacral curve is followed well forwards by the examining fingers. If, passing from the sacral promontory, the tips of the fingers can reach and follow round the pelvic brim on either side it is almost certain that the brim is reduced in size.

When any evidence of pelvic contraction is detected or suspected it is advisable to employ radiological pelvimetry to give a more detailed picture of the pelvic architecture and to provide useful estimations of the more important diameters, some of which are not readily accessible to clinical assessment. This method is not infallible and, in the hands of inexperienced radiographers and radiologists, may give misleading figures. Oc-

asionally unreliable readings may result not only from faulty technique but also from tilting of the pelvic bones, in particular of the sacrum when the joints are more than usually flexible and the patient is put into unnatural positions for radiography. Although it provides an extremely valuable aid to diagnosis, it is uneconomic to use this method in all cases and it does not obviate the necessity for a careful clinical assessment.

Attention should now be directed to the assessment of the size and pliability of the foetal head. The previous diagnosis of the position of the head in relation to the four quadrants of the pelvis and to the intermediate positions is confirmed by palpation of the accessible sutures and fontanelles of the vault. An impression of the degree of flexion, the size, the extent of ossification and the pliability of the foetal head is then gained by bimanual palpation together with determination of the width of the accessible sutures and fontanelles. The possibility of hydrocephalus must be kept in mind when the head is large and the sutures broad, and the increased risk of intra-cranial injury in cases of the small poorly ossified skull of the premature baby must not be forgotten. The greater the arc of the palpable segment of the vault or dome of the skull the larger is the head likely to prove.

The head is then flexed and depressed into the pelvic brim by the abdominal hand as the degree of descent, and therefore the degree of proportion, is assessed by the fingers in the vagina. At this stage the more acute the angle between the anterior parietal bone and the back of the pubes the more favourable is the outlook. The thumb of the right hand brought over the pubes can now be used to estimate the degree of overriding of the foetal head over the pubes and to confirm the abdominal findings. It is important, in fitting the head into the brim, that it should not be tilted to direct the sagittal suture forwards or backwards. Tilting forwards tends to give the impression of a less favourable, and backwards of a more favourable outlook than is really justified. The head should, therefore, be pressed down at right angles to the pelvic brim in the axis of the pelvis, the normal tilt of the pelvic brim being kept in mind. Bimanual assessment is a valuable method of examination in all cases of possible disproportion. During labour it can be carried out with an even greater measure of accuracy and the state of the foetal membranes, the amount of descent during uterine contractions, the size of the caput succedaneum and the degree of moulding can all be taken into consideration. Progress has been made with radiological cephalometry, but in general it has not yet attained the accuracy and reliability of pelvimetry. In centres in which this method of

examination has been developed and given special attention very good results have been claimed. It is a method of examination which is likely to become increasingly useful in the future.

The clinical assessment of disproportion therefore depends upon a careful examination of the maternal pelvis and of the foetal head followed by fitting the head into the pelvis. The size of the pelvis can be estimated with a reasonable degree of accuracy by palpation of its outlet and cavity and

measurement of the diagonal conjugate. The size of the foetal head can be judged by abdominal vaginal and bimanual vagino-abdominal examination. The relative sizes of the head and pelvis can then be estimated by direct fitting of the head into the pelvic brim during bimanual palpation. The importance of frequently repeated examinations cannot be overstressed. Radiology provides a valuable auxiliary method of assessment in experienced and careful hands.

CHLORAMPHENICOL IN NON-TUBERCULOUS URINARY INFECTIONS

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Chloramphenicol (D-threo-1 paranitrophenyl-2-dichloroacetamide-1, 3 propanediol) is a pure crystalline substance obtained from cultures of the streptomyces venezuelae (Ehrlich *et al.*, 1948). Synthesis is relatively simple. It is administered in capsules containing 250 mgm. as it has a bitter taste and is not very soluble in water. When it is necessary to administer it parenterally, propylene glycol is used as the vehicle. It is relatively stable in that it retains 100 per cent. of its activity at a pH of 0.4 to 9.56 and is unaffected by boiling in distilled water for a number of hours (Gottlieb *et al.*, 1948).

Chloramphenicol is excreted by the kidneys in greater concentration than that found in the blood. After 1 g. a peak is reached in the blood and urine at two hours, at which time the concentration is about 33 times greater in the urine than in the blood (Ley, *et al.*, 1948).

With the help of the Medical Research Council 17 cases of non-tuberculous urinary infection have been treated with chloramphenicol and the results studied. No case was accepted for treatment unless there had been a thorough and prolonged course of treatment with urinary antiseptics and penicillin. Penicillin and streptomycin were administered when the tests showed the organisms were sensitive to these antibiotics. The dosage, mode of action and value of these agents has re-

cently been reviewed by Wells and Marcus (1949) and will not be described in this communication.

Synopsis of Cases Treated

Sensitivity tests showed streptomycin and penicillin resistant strains of organisms in all cases.

Case 1

W.H., aet. 76. Cystitis and epididymo-orchitis due to indwelling catheter and tidal drainage after abdomino-perineal excision of rectum.

30.11.50. Urine—moderate number of pus cells and B. coli. Sensitive to 32 units/ml chloramphenicol. Chloramphenicol, 750 mgm. six-hourly. Total dosage, 9 gm.

6.12.50. Urine—n.a.d. sterile. Epididymo-orchitis improving.

9.12.50. Urine—sterile. Epididymo-orchitis resolved.

18.4.51. Urine—sterile.

Remarks. Rapid and permanent sterilization of the genito-urinary tract.

Case 2

142067 F.B., aet. 73. Suppurative pyelonephritis after catheterization for chronic re-