COXA VALGA : WITH REPORT OF A CASE ASSOCIATED WITH ANKYLOSIS OF BOTH HIPS.

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THE condition of coxa valga is one about which little or nothing was known until the advent of expert skiagraphy, and as these cases are comparatively rare, I thought it would be of interest to the members of this Section to bring an example of the condition before them to-night, more especially as I believe this to be the first case to be reported to the Academy. A description of the deformity has not yet found its way into the text books, and few monographs have appeared on the subject ; the best account in English is that of Tubby, (1) whose classification I have followed in the subsequent remarks.

Coxa valga is, of course, the reverse of coxa vara, the essential part of the deformity being that the normal angle of inclination of the axis of the neck of the femur to the axis of the shaft is opened out. This angle normally varies from 125° – 128° , so that if it, in a given case, measures more than 128° the condition is one of coxa valga, whereas if it is less than 125° we have coxa vara. It has not yet been determined whether there is an alteration in the curve of the neck of the femur itself in this deformity analogous to the curve convex forwards found in coxa vara. This point can only be decided by *post-mortem* examinations on numerous cases.

As regards the ætiology of this condition, we may divide the cases into Congenital and Acquired.

A. Congenital. Skiagraphy has taught us that coxa valga is commonly associated with congenital dislocation of the hip. The valgus deformity in these cases may be either *primary*, and, therefore, the cause of the dislocation, the neck of the femur being too straight to allow of proper articulation between the head of the bone and the acetabulum, or *secondary*, and caused by the lateral thrust of the iliac bone when the child begins to walk. Whether we ever get congenital coxa valga without dislocation is at present a moot point, into the discussion of which we have not time to enter to-night.

B. Acquired. In considering the causes of acquired coxa valga we must remember that the normal shape of the head and neck of the femur depends on a nice adjustment of certain forces, viz., the weight of the limb, the pressure of the body weight, the pull of the pelvi-femoral muscles, and the amount of resistance the bone is able to offer to pressure. It is, of course, clear, that, apart from some process of bone softening, the resistance of the bone to alteration of its shape will be sufficient, except in childhood and adolescence, to counterbalance any disturbance of these forces, and so to prevent deformity. Consequently, the great majority of acquired cases are found in children and young adults.

These acquired cases may be divided into four classes :—

- (1) A class caused by the traction of a pendant shortened limb, or by the non-use of a limb for a long period. These cases are found in children associated with such a condition as infantile paralysis of the lower extremity. Here we have the pull of the weight of the limb, the loss of the pressure due to the transmission of the body weight, and the absence of the normal

pull of the muscles round the joint, all tending to cause a straightening out of the neck of a femur already atrophic from disuse.

- (2) A static or functional form, caused by alteration in the shape of the bone compensatory to some other deformity. It has been found by experience that if in children the limb is, from any cause, held for a lengthened period in a position of adduction we get as a result coxa vara of the neck of the femur, whereas if the position of abduction is long maintained we get coxa valga resulting. For example, genu valgum of one knee causes coxa vara of the same side and coxa valga of the opposite side, or, again, if one leg is shorter than the other the short leg is abducted to enable the child to walk, and coxa valga on that side results, or, again, if there is a curve convex outwards in the shaft of one femur, due, for instance, to rickets or the malunion of a fracture, we again get coxa valga on that side.
- (3) A form associated with any process of bone softening, such as rickets or tuberculosis, accompanied by false adjustment of the forces normally acting on the joint, *e.g.*, it is quite conceivable that coxa valga would be produced by prolonged excessive extension in a case of tubercular hip.
- (4) A traumatic form, due to malunion of an impacted fracture of the neck or separated epiphysis.

Signs and Symptoms.—As regards the signs and symptoms, there is not much to be said. Pain is not a marked feature, although it is sometimes present early in the case. The leg is abducted and rotated outwards, while there is marked limitation of adduction and internal rotation. In unilateral cases there is lengthening of the limb to the extent of 2–3 cms., which is not compensated for either by tilting up of the pelvis

or by adduction of the limb. The gait in unilateral cases is limping, with the trunk inclined to the bad side, but, in bilateral cases, is rolling and unsteady, being rather similar to that of double congenital dislocation of the hips. This unsteady gait is due to the fact that the head of the bone, on account of the abnormally straight neck, cannot articulate properly with the acetabulum. Again in a bilateral case the patient stands on one leg with great difficulty, and in a unilateral case the patient, when standing on the affected leg, inclines the body to that side, a position just the reverse of the Trendelenburg's sign in single congenital dislocation of the hip. Finally, the great trochanter is flattened and often below Nélaton's line, and in unilateral cases there is some scoliosis of the lumbar spine, convex to the affected side.

Diagnosis.—The diagnosis largely rests with careful skia-graphy, although the position of the limb (abducted and rotated out with limitation of adduction and internal rotation, but without compensatory adduction) is said to be pathognomonic. In taking X-ray photographs of this condition it is essential that the tube should be directly over, or even outside the joint, for a photograph of a normal joint taken so that the rays pass in a downward and outward direction while the limb is everted will show apparent straightening out of the neck of the femur.

Treatment.—Before discussing the treatment of coxa valga it is well to point out that some examples of this deformity are discovered accidentally, as there may be no definite symptoms. Indeed, in these so-called physiological cases the angle of inclination may measure as much as 140° , instead of a normal maximum of 128° .

The methods to be employed in cases requiring treatment are mainly operative. Blanchard (2) advises cuneiform osteotomy of the neck of the bone; Galeazzi (3) linear osteotomy at the base of the neck, and he quotes successful cases;

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FIG. 1.

while Allison (4) advocates subtrochanteric osteotomy as being sufficient, and by far the most simple procedure. Tubby (1) suggests, but does not advocate, the taking of a wedge of bone, with the base of the wedge on the inside, from the subtrochanteric region, *i.e.*, the reverse of the operation often performed for coxa vara. As regards non-operative methods, David (5) succeeded in improving a case by placing the limb as far as possible in the adducted position, and fixing it so placed in plaster of Paris. Tubby also tried this procedure, but without success. The wearing of a boot with a high sole will sometimes improve the gait, and even lessen the angle of inclination by altering the lines of force acting on the neck of the bone. I performed double subtrochanteric linear osteotomy in the case before you, the details of which I now propose to give you.

CASE.—K. S., a little girl, aged five, was sent up to me by Dr. McQuaid, of Cootehill, with the history that a year previously she had been seriously burnt as a result of her clothes catching fire. Before the accident she was able to walk normally, but when the large superficial burn was healed it was found that she was unable to extend her thighs, and locomotion was greatly interfered with. The burn took nine months to heal, and for most of that time she used to sit for the greater part of the day in a chair at the cottage fire.

On examination I found her to be a plump, well-developed child, with an abdomen very suggestive of rickets, some beading of the ribs and enlargement of the lower epiphyseal line of the radius. The outer side and front of the right buttock, and the right lateral aspect of the trunk as high as the lower margin of the ribs, was covered by a thin, red, papery scar, which also encroached on the right iliac region of the abdomen. This was, apparently, more or less superficial, and not extending deeply into the muscles. Both hip-joints were ankylosed, only allowing a range of movement of about 10° . Both thighs were flexed at an angle of 60° with the horizontal, were abducted 25° from the axial line of the body, and everted to the extent of 45° . Both tro-

chanterers were greatly flattened. In attempting to walk she inclined the body very far forwards with a deep lumbar lordosis. She was greatly disinclined to walk without a helping hand, and her gait was unsteady and swinging. The accompanying photograph (Fig. 1) shows her position very well when standing. Skiagrams were taken with the rays passing downwards and outwards, vertically downwards, and downwards and inwards through the hip-joint, and showed in all positions a great straightening out of the neck of the femur, so that even in those taken with the tube outside the joint the angle of inclination is about 170° . The outline of each joint is also rather "furred" in the photographs. On examination under an anæsthetic it was found that no improvement could be made in the position of the limbs, so that finally I decided to do a double sub-trochanteric osteotomy. This operation was performed on January 10th, and the child was placed in a double Thomas's splint and extension by means of a two-pound weight applied to each limb. To-night, three months after the operation, I present the child for your inspection, so that you may judge of the result. You will notice that she is now able to stand erect (Fig. 2), and on a much narrower base than formerly, so that the flexion and abduction have been almost completely corrected by the operation. Of course she will never be able to walk freely, as her hip joints are still ankylosed, but she is already able to get about quite satisfactorily, and no longer inclines the upper part of her body forward in the marked manner shown in the first set of photographs.

As regards the ætiology of this case, I am inclined to look on the ankylosis as being due to that form of osteo-arthritis which Howard Marsh (6) has called attention to, which is caused by the absorption into the circulation of septic products. As pointed out by Marsh, acute symptoms may be almost absent, and may easily have been masked in this case by the pain of the healing burn, and the quantity of toxins absorbed from the large area involved in the burn must have been far more considerable than that in some cases mentioned by him, for he quotes a case caused by absorption from a small alveolar sinus. With regard to the coxa valga, I believe it to be an

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FIG. 2.

acquired condition in this case, for here we have a patient who not only was young enough to allow of moulding of the bones, but who also was the subject of rickets and of a quiet osteo-arthritis, and in whom the normal forces acting on the hip-joint were, for the period of nine months, greatly disturbed by her not being able to walk, and by the sitting position assumed for the greater part of each day.

In conclusion, I desire to thank Dr. W. G. Harvey, who kindly took great trouble in getting the first set of skiagrams, and also Dr. H. W. Mason, who took the skiagrams of the post-operative condition.

REFERENCES.

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- (2) Blanchard. Amer. Jour. Ortho. Surg. January, 1907.
- (3) Galeazzi. *Ibid.*, iv., p. 244; and 1907, p. 245.
- (4) Allison. *Ibid.* October, 1907.
- (5) David. Monats. f. Chir. u. Phys. 1904. No. 5.
- (6) Marsh. Brit. Med. Journ., 1902, Vol. II., p. 1831; and 1906, Vol. II., p. 1627.

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MR. J. LENTAIGNE said the condition was a very rare one, though it had doubtless been met, but not recognised. Its discovery was entirely due to the use of radiography.

MR. STOKES enquired as to what joints were most commonly affected in cases of septic absorption.

MR. BLAYNEY said they all felt they knew very little about the subject, and for that reason there could be little in the way of discussion. His attention had been called to the fact that, in cases of congenital dislocation, the skiagrams seemed to show the neck as being a direct prolongation of the shaft.

MR. J. LENTAIGNE suggested that the ankylosis of the hip joints occurred first, and with continued growth the position of the hips would tend to produce the condition. There must be something tending on both sides more or less equally to produce the deformity.

MR. PRINGLE, in reply, said the arthritis did not select any special joints. He thought the position of the child had determined the site of the disease.