other forms of metabolic alkalosis is, of course, well recognized. The P.A.S. could hardly have produced the observed electrolyte changes, because salicylate causes a respiratory alkalosis, with low alkali reserve, but the addition of a mild respiratory alkalosis to the metabolic alkalosis caused by the liquorice would favour the occurrence of tetany.

It is understood that difficulty has been found in producing electrolyte abnormalities experimentally with some preparations of liquorice, and it is possible that there may be a variation in the D.C.A.-like activity of different batches of liquorice extract.

It is interesting that the urinary chloride concentration, estimated by the Fantus test, remained very high (4-8 g. per litre) throughout the last week, contrary to what one might expect from the combined effects of hypochloreaemia, alkalosis, and D.C.A.-like liquorice. In fact, this is often found in hypokalaemia, as Fourman (1951) points out.

Summary

A patient receiving sodium *para*-aminosalicylate for tuberculous meningitis developed a metabolic alkalosis, from which she died.

Liquorice, used as a flavouring agent with the P.A.S., appears to have been responsible.

I am grateful to Dr. N. Kletts for permission to record this case. My thanks are also due to Mr. Varley for the biochemical determinations, and Dr. D. A. K. Black for helpful advice.

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CASE ILLUSTRATING HAZARDS OF MANIPULATIVE TREATMENT IN LUMBO-SACRAL DISK PROTRUSIONS

BY

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A recent experience having a bearing on the practice of manipulation of the spine for lumbo-sacral disk lesions seems worth recording.

Case Report

A man aged 36 who was engaged in heavy work had a sudden onset of low-back pain spreading down the back of his right leg to the foot. There was a past history of two previous similar attacks. A radiograph of the lumbo-sacral spine showed the L5/S1 joint space to be diminished posteriorly; otherwise there was no abnormality.

The patient was suffering from a protrusion of an intervertebral disk of the lumbo-sacral spine. The physical signs did not alter during five weeks' rest in bed, although the symptoms were definitely diminished. He was encouraged to move his back under intravenous procaine analgesia (5 ml. of a 1% solution of procaine). Although only 30 degrees of flexion was allowed he suddenly experienced very severe pain down the back of his right leg, which caused him to cry out. Morphine was necessary. Flexion of the spine and raising of the straight leg were not possible. The pain continued for 48 hours, until laminectomy was performed.

At operation the cauda equina was displaced backwards by a large disk protrusion, over which the first sacral root was tightly stretched. Furthermore, deep to this, in the intervertebral space, was a considerable quantity of "sequestered" nuclear material, lying free and comprising the remainder of the nucleus pulposus. This could have been forced into the spinal canal by pressure resulting from increased movement of the spine. The operative findings are illustrated in Fig. 1; the disk material after removal is shown in Fig. 2.

Follow-up Report.—On the day after operation, February 12, 1951, the patient was free from pain but had some numbness of the right foot. He remained free from symptoms and was allowed up 17 days after operation. He was discharged to his own home on March 5, and returned on April 2 to the same heavy work that he had been doing pre-operatively. He has since been at this work, and when last seen (September 16) he was symptom-free.

FIG. 1.—Diagrammatic representation of the operative findings.

FIG. 2.—(A) The disk material lying free in the spinal canal, and (B) the disk material in the intervertebral space. Marked distances equal 1 cm. and 2 cm.

Commentary

The increased flexion of the spine forced more disk material into the spinal canal, exaggerating the symptoms and signs of lumbo-sacral root pressure. The operative findings of more "free" nuclear material lying ready to enter the spinal canal demonstrates that had more flexion been obtained, as in a forceful manipulation for instance, the size of the "tumour" in the spinal canal might well have produced a cauda-equina lesion.

Although it is not our practice to use manipulation in the treatment of lumbo-sacral disk lesions, we considered the possibility that we were dealing with an uncommon type in which the extruded disk material was nipped by the posterior margin of adjacent vertebral bodies and so prevented from returning. We wondered if the muscular relaxation and increased movement of the spine, made possible by analgesia, would result in sufficient widening of the intervertebral space to allow the prolapse to reduce spontaneously.

It is interesting to recall Goldthwait's (1911) report of a case made worse by manipulation. The following is a brief extract.

A man aged 39 developed a severe attack of "lumbago" after a fairly long car journey and carrying a heavy suitcase for over half a mile. A previous similar attack seven years before had been treated with a surgical corset and had resulted in complete recovery. After a restless night the patient got up and took a tub bath. "On trying to get out of the tub, in bending forward and straining to get up, something slipped in his back, entirely different from anything he had before experienced. The body was drawn forward and to the left; there was intense pain, so that it was with great difficulty that he was able to get back to his room, and the suffering continued until he was seen by the doctor four hours later. At that time the body was held bent forward and to the left. There was extreme tenderness in the sacral region, with pain extending into the legs, the right being worse than the left." The condition was regarded as a sacro-iliac displacement and two manipulations were given, the first under general anaesthesia and the second without an anaesthetic. A cauda-equina lesion was produced, the patient having urinary and faecal incontinence and a flaccid paraplegia.

The case stimulated Goldthwait to much thought and research, from which he concluded that intervertebral disk prolapse played a large part in the production of "lumbago," "sciatica," and cauda-equina lesions.

I wish to thank Mr. B. H. Burns and Mr. R. H. Young for their permission to publish this case, treated under their care at St. Peter's Hospital, Chertsey.

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Medical Memoranda

Prostatic Obstruction and Inguinal Hernia: A New Approach

Straining at micturition and the weakening of the tissues which accompany advancing age are well-recognized factors in the aetiology of inguinal herniae. It is not surprising, therefore, that cases of prostatic obstruction are often complicated by herniae. McDonald and Huggins (1949) found the incidence to be 15%. These herniae are liable to the serious complication of strangulation, itself a more lethal malady than prostatic obstruction. It thus behoves the surgeon to cure both conditions.

Now that asepsis, stressed by me (Moore, 1939) and by Wilson Hey (1945), has been more generally observed in urology, prostatectomy has become a safe operation. Wilson Hey has already stated that it can be safely combined with other procedures, including herniorrhaphy. It has become my routine to deal with the inguinal hernia at the same time as the prostate. For this reason, when the patient has a hernia I recommend open operation, even in those types of prostatic obstruction in which I would normally carry out a transurethral procedure. For the past 12 years I have used almost entirely only the transverse suprapubic incision for operations on the prostate and bladder. Through this incision I also carry out inguinal herniorrhaphy—often on both sides.

Although many patients who present with prostatic obstruction are found on examination to be suffering from inguinal hernia, one also encounters cases of inguinal hernia in old men who make no complaint of urinary symptoms. On direct inquiry and investigation many are found to be suffering from prostatic obstruction. If the prostate is not treated they often develop post-operative retention of urine

which fails to respond to conservative measures. Eventually they have to be submitted to prostatectomy, in either one or two stages, with all the dangers of the sepsis which has developed during the interval. There is no question that the period in hospital after a one-stage operation dealing with both conditions is far shorter than that following prostatectomy performed some time after herniorrhaphy. In fact, the period in hospital after a combined prostatectomy and herniorrhaphy is no longer than that after a prostatectomy alone.

TECHNIQUE

In old bad-risk cases I always employ low spinal anaesthesia and a local block of the abdominal wall. A transverse incision 4–6 in. (10–15 cm.) long is made a finger-breadth above the pubis. If only a one-sided hernia is to be done more of the incision is placed on that side of the midline. The skin, superficial and deep fascia, and the anterior rectus sheaths are opened in the line of the incision, which extends a little lateral to the rectus into the aponeuroses of the external and internal oblique muscles on the side of the hernia. In the midline the rectus sheath is separated from the linea alba down to the pubis and up towards the umbilicus for 2–3 in. (5–7.5 cm.). The rectus muscles are then separated in the midline and the type of prostatectomy preferred is carried out. In my practice this is almost always a Millin prostatectomy.

When this procedure has been completed the retractors are removed and the muscles allowed to fall together. The inguinal canal is then approached lateral to the rectus muscle between the internal and external obliques, where they are fusing to form the rectus sheath. When these are gently separated the arching fibres of the internal oblique forming the cremasteric muscle are soon visible. These are divided in the length of the canal and the cord and its contents exposed. The sac, whether direct or indirect, is dissected free and dealt with in the ordinary way. If the canal is weak and requires strengthening, any of the usual methods can be used. When the Bassini procedure or one of its modifications is adopted it is evident that the conjoined tendon can be brought down to the inguinal ligament with much less tension than in the more direct approach, because the internal oblique has already been incised at the level of the suprapubic wound. It is important in closing the transverse incision that the upper leaves of the external and internal obliques should be sutured to the lower one of the external oblique only, otherwise the relaxation of the internal oblique already obtained is lost. During the operation I often divide the vas as near the external ring as possible, preferably on the external side. Before the wound is finally closed the cave of Retzius is usually, but not always, drained.

Post-operative Course.—Sulphadimidine, 1 g. six-hourly, and penicillin, 200,000 units intramuscularly eight-hourly, are given two days before the operation, and are continued for five days after it. In cases with urinary infection due to organisms insensitive to these agents streptomycin is sometimes used, 0.5 g. being given by intramuscular injection 12-hourly for four to five days. Normally, patients are allowed up on the second day after operation. The cave of Retzius drain is also removed on that day. The catheter is removed on the fifth day. When a hernia has been done at the same time as the prostatectomy the patient is usually kept in bed for seven days. Patients are discharged from hospital 10 to 12 days after the operation.

COMMENT

I have carried out this operation many times and have had no cause to regret it. Many of the patients have been of the poor, old, municipal-hospital type. The results of the cures of the herniae have been as good as those obtained by any method of treatment in people of this age. The patients are delighted to get rid of their ruptures at the same time as their urinary trouble; surgically they are very much safer. It may be objected that leakage of urine may lead to infection