COMMON OBSTETRICAL INJURIES AND THEIR SEQUELAE*

BY

DOUGLAS MILLER, M.D., F.R.C.S.ED., F.R.C.P.ED.
GYNAECOLOGIST, THE ROYAL INFIRMARY, EDINBURGH

It is the general experience of those whose work is concerned with the treatment of gynaecological disease that parturition is ultimately responsible for a considerable proportion of the invalidism with which they have to deal. The importance of childbirth in this regard is reflected in the large number of gynaecological patients who relate their disability to a previous pregnancy or labour. In this communication, however, I wish to approach the subject of obstetrical injuries and their sequelae from the obstetrical rather than the gynaecological standpoint. I propose to refer only to the more common types of injury, and to consider how these are produced, how far they are avoidable, and to what extent subsequent ill-health may be prevented or minimized.

Anatomical Considerations

As a preliminary it is necessary shortly to revise certain anatomical considerations which will assist to a clearer understanding of the mode of production and of the consequences of the various injuries described. The uterus and adjacent pelvic structures are maintained in their normal position by a number of agencies, of which the two most important comprise: (1) a specialized arrangement of the pelvic fascia; and (2) the pelvic floor.

The pelvic fascia, which contains a considerable admixture of fibro-muscular tissue, is so disposed around the isthmus of the uterus as to constitute a powerful suspensory apparatus. The presence of non-striated muscular tissue in the pelvic fascial layers may be inferred clinically from the ease with which the cervix can be drawn down towards the vulva in the anaesthetized as compared with the conscious patient, and can be demonstrated histologically in tissue removed at operation. From either side the fascia converges on the cervix and to a limited extent on the vault of the vagina in the form of the lateral or transverse cervical ligaments. From before backwards the fascia extends from the pubes to the cervix, embracing the neck of the bladder, and posterior to the cervix, passing upwards and backwards to the sacrum as the utero-sacral ligaments, as well as downwards in the recto-vaginal septum as the rectal fascia. The pubo-cervical segment of the fascia assists in the support of the bladder, and also, in virtue of the non-striated muscular tissue it contains, serves to reinforce urinary control. While the individual is at rest the bladder sphincter is adequate to prevent the escape of urine. On exertion, however, the action of the sphincter is normally supplemented by contraction of the pubo-cervical fascia. If this tissue has been damaged or is constitutionally feeble the bladder is continent while the patient is at rest, but if the tension in the bladder is suddenly increased by such exertions as running, coughing, or laughing, dribbling of urine or "stress incontinence" occurs.

The pelvic floor, and especially its posterior segment, provides the second chief support of the pelvic viscera. Its main constituents are the levator ani and perineal group of muscles, which, with their associated fascia, form a strong sling embracing the vagina and rectum and sustaining them, and indirectly the uterus and bladder, from below.

Over-stretching of Anterior Vaginal Wall

While much of the disability that follows childbirth occurs in consequence of intervention which is neither judicious nor skilful, I want first to deal with an injury which may result from an unwise conservatism in regard to forceps delivery. It consists in an over-stretching of the vaginal walls and subjacent tissues, especially the pubo-cervical fascia, as the result of the head being allowed to remain for an undue time in the lower part of the vagina. Eventually delivery may be completed spontaneously or by forceps and possibly without any skin tear, but the vaginal tissues and underlying fascial planes have been over-stretched to such an extent and for so long that their elasticity and tone are permanently lost. Prolapse of the vaginal walls with cystocele formation and generally with incontinence of urine is a common result.

This development may follow one prolonged labour in which assistance has been unwisely and unnecessarily withheld, or it may not appear until the tone of the vaginal walls and subjacent tissues has been impaired by repeated child-bearing. I do not wish to give the impression that I am advocating a more frequent resort to the use of forceps in obstetrics generally, but it is necessary to emphasize the difference between applying forceps when the head is in the cavity or at the brim of the pelvis, and applying them when the head is showing at the vulva. Conservatism in respect of the latter operation is occasionally carried too far.

Injury to Pelvic Floor

A second type of injury consists in over-stretching or laceration of the pelvic floor, and again the consequences of this may appear after one difficult labour or may represent the cumulative effects of a series of labours in each of which trauma has been less severe. If the injury is not suitably repaired, or if healing is unsatisfactory, some degree of genital prolapse inevitably follows. Essentially this is due to lack of support from below, together with the alteration in the anatomy of the vagina which follows, for instead of being capacious above and narrow below the vaginal canal becomes cylindrical, and the axis of the vagina tends to be more vertical and less oblique than normal.

Prolapse of the anterior vaginal wall with cystocele formation is the first and commonest sequel to pelvic floor damage, and for many years may be unassociated with any other disability. Provided the upper supports of the uterus—namely, the lateral cervical ligaments—have not been impaired, prolapse of the uterus itself is a late development and may not appear till many years have elapsed. In time, however, these ligaments yield to the constant and progressive downward traction of the vaginal walls on the cervix, and descent of the uterus occurs. Not infrequently this development appears at, or shortly after, the menopause, probably in consequence of the general atrophy of the pelvic structures which follows cessation of normal sexual activity. In such cases, where prolapse of the uterus is a late phenomenon, the supravaginal cervix may become markedly elongated as the result of the constant downward traction of the vaginal walls on the vaginal cervix, countered by the action of the intact lateral cervical ligaments attached to the uterine isthmus.

Damage to Lateral Cervical Ligaments

A third type of injury is that which is associated with the application of forceps before the cervix is fully dilated. When traction is exerted the head and cervix are drawn down together towards the vulva; if the cervix is unusually soft it will split to allow the head to pass,

* Address delivered to the Hull Medical Society.

and the lateral cervical ligaments may escape damage. In such cases prolapse of the uterus does not necessarily follow; indeed, the subsequent scar tissue that forms round the torn cervix may so fix the uterus that prolapse never occurs. In general, however, the cervix does not give way until it has been drawn down so far that the lateral ligaments are seriously over-stretched or torn. Prolapse of the uterus is then inevitable, and is, as a rule, an early development, appearing within a few weeks or months of delivery.

Where forceps are applied after the cervix is fully dilated but while the head is still high in the vagina, strong traction must generally be applied, and the vaginal walls tend to be drawn down in advance of the head. Through the attachment of the vaginal walls to the cervix, and to a less extent to the lateral cervical ligaments, these ligaments again are over-stretched and prolapse of the uterus will follow.

It is further obvious that in both these types of delivery the lower genital tract, instead of being expanded gradually, as occurs in normal labour, is rapidly and forcibly distended in the process of extraction, and tearing of the vaginal walls and separation from their subjacent supports is inevitable. In forceps delivery of this kind injury is unavoidably extensive, and prolapse of the uterus and adjacent viscera generally appears within a few months of delivery.

Laceration of the Cervix

Laceration of the cervix is the commonest of all obstetrical injuries, for some degree of tearing occurs in every first labour; but if complete dilatation and effacement of the cervix have taken place naturally the injuries are as a rule superficial, and there is healing without subsequent disability. Occasionally, however, serious tearing of the cervix may be found to have occurred after a labour which has been completely spontaneous. In my experience this accident happens less frequently in association with precipitate labour, which is generally believed to involve trauma of this kind, than in a labour in which the membranes have ruptured prematurely and in which the first stage has been seriously prolonged. In this type of labour the cervix not infrequently becomes oedematous and friable, and may tear deeply before full dilatation takes place.

Interference of any kind with the natural process of dilatation constitutes by far the most frequent cause of laceration of the cervix. If the cervix is dilated manually, no matter how slowly and gently; if forceps are applied before the cervix is fully effaced, no matter how carefully the rim of the cervix may be "shoe-horned" over the head; or if an attempt is made, no matter with what dexterity, to extract the breech or after-coming head before the cervix is fully dilated, tearing will occur to such an extent as to cause subsequent disability.

Injury to the Rectal Fascia

The appearance of a trickle of blood at the vulva towards the end of the second stage of labour, and often noticed as the head recedes in the intervals between the pains, is generally a sign of tearing of the posterior vaginal wall. Such a tear may occur without any breach of the skin perineum, and when it is suspected its extent and depth should be determined by separation of the labia and the insertion of the gloved forefinger into the vagina. If the rectal fascia should be involved, the anterior wall of the lower part of the rectum will herniate through the rent in the fascia and become adherent to the cicatrix in the posterior vaginal wall, constituting a rectocele. Moreover, if, as is usual, the perineum has been damaged the posterior vaginal wall tends to prolapse, and the bowel to which it is adherent is drawn

downwards and forwards with it. The development of the rectocele is further encouraged by the normal forward angulation of the bowel at this level and by straining at stool, especially if the patient is constipated.

Complete Perineal Tear

It is unnecessary to say anything of the mode of production of this type of tear in which the bowel is involved. Extraction of the breech in a primipara and delivery of the head face to pubes comprise the majority of cases in which it takes place. Its consequences, if healing is unsatisfactory, consist in a varying degree of loss of bowel control. Prolapse of the uterus is a rare sequel to this injury, probably because of the absence of straining at stool and also because the tear, while extensive, is median in position and superficial in depth, so that the levator sling escapes damage.

While each of these injuries and its results has been considered individually, it is obvious that the nature and extent of trauma and of subsequent disability may vary within wide limits. I have not included retroversion among the sequelae of obstetrical injuries, as it is doubtful whether this displacement is ever a direct result of damage sustained in childbirth. It is more commonly a recurrence of an antecedent or congenital displacement. Indirectly, however, it may result from injury, since the uterus, as it prolapses, commonly assumes a position of retroversion. Moreover, a primary backward displacement undoubtedly does predispose to prolapse since the axis of the uterus, instead of being at right angles to that of the vagina, is brought into alignment with it, and descent more readily follows.

Prophylaxis

Time and space do not allow of reference except in very general terms to the prevention either of obstetrical injury or of its consequences. The avoidance of difficult labour by the ante-natal recognition of disproportion; careful determination of the position of the head before forceps are applied; conservatism, on the one hand, in the use of forceps unless and until the head is low in the pelvis, and, on the other hand, the avoidance of unnecessary over-stretching of the vaginal walls and subjacent tissues by unduly withholding assistance; the evacuation of the bladder at regular intervals during labour and especially before forceps are applied—these are not counsels of perfection but elementary obstetric principles, to the non-observance of which, nevertheless, much of the invalidism that follows childbirth is due.

As a prophylactic procedure the simple operation of episiotomy calls for special mention. To allow a patient to deliver herself after the head has been at the pelvic outlet for many hours and then boast that this was achieved without a tear, as midwives are apt to do, is not only inhumane but thoroughly bad obstetrics. If the head is not born within half an hour after it shows at the vulva the perineal edge should be incised. This at once relieves the tension on the anterior vaginal wall, it saves unnecessary suffering and exhaustion, and it gives a clean-cut wound which is more easily repaired and which heals more readily than an irregular tear. A median episiotomy carried backwards for about three-quarters of an inch is generally sufficient, and has many advantages over a lateral or oblique incision. It occasionally prevents tearing of the anterior commissure or at the edge of the vestibule, an injury which may cause troublesome bleeding and which is sometimes difficult to repair. If the bowel is in danger, as in a primiparous breech extraction or in the delivery of the head face to pubes, the median incision may be extended towards the ischio-rectal fossa at one or other side. The operation

is performed under light general anaesthesia, and, as a rule, it is best, though by no means always necessary, to complete the delivery with forceps.

The care and skill with which injuries are repaired are obviously important factors in the prevention of subsequent disability. The technique of repair is beyond the scope of this paper, but in passing I would endorse B. P. Watson's teaching that where a difficult or extensive repair operation is necessary it may be advisable not to carry this out during, or immediately after, the third stage of labour. If the confinement has occurred during the night in a private house and the attendant is single-handed, a better result is likely to be obtained if the operation is postponed till the following day, when the operator has the advantages of adequate assistance, an anaesthetist, fresh sterile dressings and lotions, and a more bloodless field in which to work.

After-care in the Prevention of Prolapse

Where obstetrical injury, especially of a serious nature, has been sustained much can be done by care and guidance in the convalescent period to minimize the incidence and extent of subsequent disability. In the after-care of the patients the importance of an adequate period of recumbency calls for special emphasis. In all cases the parturient should be kept in bed at least until the uterus is no longer palpable in the abdomen and the lochial discharge no longer contains fresh blood, and where more than superficial injury has been sustained a fortnight may be considered the minimum time necessary for sound healing to occur.

In this connexion the practice of getting patients up on the sixth or seventh day and discharging them on the eighth or ninth day after confinement, which many maternity hospitals are forced to adopt owing to shortage of beds, is greatly to be deplored. After the lying-in period is over the patient should be given clear and precise instructions in regard to her conduct of life generally, and in particular in regard to the amount of rest and the amount and character of exercise that is advisable during the three months which follow the confinement. I do not forget the circumstances which make it difficult for the patient of the hospital class to secure the amount of rest she should have, and it is largely because this is, as a rule, totally inadequate that the incidence of genital prolapse is relatively so much higher in this class of patient.

Massage is of value, and remedial exercises, with which the patient should be encouraged to persevere for three months, will do much to restore tone to muscles that have been over-stretched or damaged. A well-fitting corset, by giving adequate support to the abdominal organs, will also minimize the harmful effect of intra-abdominal pressure, especially in the obese patient. Bronchitis and constipation are common causes of strain requiring attention, and every means should be employed—including, for example, such a diet as Mellanby has advised—to promote the patient's general health, and in particular to improve her general muscular tone.

A pessary may occasionally arrest the tendency to prolapse of the uterus, especially if the organ is also retroverted, but the value of its employment as a routine procedure in incipient prolapse is open to question, for if it is large enough to be effective it may interfere with the normal shrinkage of the vaginal walls, and at a stage at which it might prove useful the vaginal tissues are frequently too sensitive to allow of its being worn without discomfort. If a pessary is employed the smallest size that is effective should be used, so as to interfere as little as possible with involution of the vagina, and it should be replaced at frequent intervals by smaller sizes until involution is complete.

Is Genital Prolapse always Preventable?

While it is true that in many cases of genital prolapse the conduct of the patient's previous child-bearing may invite legitimate criticism, the development of this lesion is by no means always preventable. In certain individuals, for example, the tissues are abnormally friable so that it is impossible to avoid tearing, or inelastic so that after labour the return to normal is incomplete. Another less common type of case is that in which a rigid cervix is forced down in front of the head almost to the vulva before dilatation is complete, so that overstretching of the fascial supports around the cervix is liable to occur and the consequent development of prolapse difficult to avoid. And, lastly, there are rare occasions when it is not only advisable but essential to hasten delivery, and where conservation of the uterine supports may properly be subordinated to the more immediate interests of mother and child. Skill and good judgement in the management of labour, together with careful after-treatment where injury has been sustained, will do much to prevent the occurrence of prolapse, but the disability may develop despite scrupulous observance of all the canons of a sound obstetric practice, and criticism should not be entertained, far less expressed, in ignorance of difficulties which may have had to be faced.

ARTIFICIAL SILK KERATITIS

BY

DAVID RANKINE, M.B., CH.B.

HONORARY ASSISTANT OPHTHALMIC SURGEON, HAHNEMANN HOSPITAL, LIVERPOOL

The keratitis about to be described occurs at a certain stage in the manufacture of artificial silk by the "viscose" process. This paper deals with the condition as it was observed in a large artificial silk factory. The factory began production in 1927, and the study of the cases started early in 1928. Full capacity for the production of artificial silk was not attained during 1928, so that greatly increased numbers of cases were met with in 1929. In all 1,598 cases were observed in these two years.

Symptoms, Signs, and Treatment

The earliest symptom was blurring of vision, with the appearance of haloes round lights. It was, too, the most important symptom, because it stamped the affection as a corneal one from the first. In a comparatively small number of cases recovery took place without the development of further symptoms, and, there being no slit-lamp available, the only objective sign was conjunctival injection, which was never very severe; workers would then say that they had been threatened with an attack, but it passed off. In the great majority, however, the condition progressed, and the blurring was followed in from half an hour to several hours by a feeling of grittiness under the lids, photophobia, lachrymation, often blepharospasm, frequently drooping of the lids without spasm, dull aching at the back of the eyes, and headache. The lachrymation tended to be profuse, and, where there was blepharospasm, the tears gushed out when the lids were separated, the separation sometimes requiring considerable force.

The pathology was as one might easily surmise from the symptomatology; in those cases which went on to irritation, fluorescein staining showed more or less desquamation of the corneal epithelium on the centre of the cornea. The destruction of tissue was essentially superficial. The keratitis was always accompanied by circumcorneal injection and by conjunctival injection of all degrees. The breath of those who were affected was