LUMBAR DISC PROTRUSIONS IN PREGNANCY

BY

J. E. A. O'CONNELL

From St. Bartholomew's Hospital, London

The occurrence of paralysis of a lower limb of the mother after labour was first described at least 120 years ago (von Basedow, 1838). The condition is uncommon, Beattie (1933) reporting an incidence of less than 1 in 2,500 deliveries. This "maternal obstetrical palsy", as it has been named, has usually been considered to result from injury to the lumbo-sacral plexus occasioned by the foetal head or obstetric forces during delivery in cases of disproportion. The hypothesis would seem to have sound foundations when paralysis follows a difficult labour and involves muscles supplied by one of the large nerve trunks passing through the true pelvis. However, doubts as to its adequacy in all cases have been expressed since the hypothesis was first put forward. Thus it is recorded that paralysis may follow an apparently normal labour and it may involve the quadriceps femoris muscle of which the nerve of supply, having no intrapelvic course, cannot be injured either by foetal head or obstetric forces. In 1944 I described four cases of intervertebral disc protrusion developing during pregnancy or the puerperium and associated with a lower limb weakness of greater or less severity; it was suggested on the basis of these cases that protrusion of a lumbar disc was an aetiological factor in maternal obstetric paralysis. The purpose of the present communication is to review the matter in the light of subsequent experience.

In Table I it will be seen that of 1,100 consecutive surgically proven and personally treated cases of lumbar disc protrusion, 347 were women, and an analysis of their case notes forms the basis of the observations which follow. The ages of the patients ranged from 16 to 60 years with the distribution in decades shown in Table II, over two-thirds of the group being in the child-bearing period of life. In Table III the incidence of pregnancy among the 347 patients is indicated, 179, or a little more than half, having borne one or more children.

Symptoms of a lumbar disc protrusion occurred in pregnancy in 70, that is, 39.1% of the patients who had been pregnant, and in 16, or almost a quarter of these cases, symptoms occurred in two or more pregnancies (Table IV). In 53 of the 70 cases no symptoms suggestive of a disc protrusion had been present before those arising in pregnancy; in the remaining 17 cases pregnancy was associated with a recurrence or aggravation of previous low back pain and/or sciatic pain. In only 12 of the

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70 patients was there a history of a recognized back
strain occurring before the onset of symptoms and
frequently the relationship of the injury to the
development of symptoms was not clearly defined.

In Table V the distribution of pain associated
with disc protrusions in pregnancy is shown. In

| A. Initial symptoms of protrusion arising in pregnancy in 53 cases |
| Low back pain alone ........ 14 cases in 5 in each of two pregnancies |
| Sciatic pain alone ........ 9 cases in 2 in each of two pregnancies |
| Low back and sciatic pain 30 cases |
| in 1 in each of three pregnancies |
| in 5 in each of two pregnancies |

B. Recurrence of aggravation of previously present symptoms in pregnancy in 17 cases

| Low back pain ............. 4 cases |
| Sciatic pain added to pre-existing back pain .... 5 cases |
| Low back and sciatic pain 8 cases |

thirteen-fourths of the group sciatic pain occurred
with or without low back pain in addition; in
one-fourth the pain was confined to the low back
during pregnancy, crural pain developing at some
later time. In Table VI the time of the onset of
symptoms is indicated. These arose most commonly
during pregnancy itself (60%); in 11% they de-
developed during labour and in 29% during the
puerperium.

| Table VI |
| TIME OF ONSET OF SYMPTOMS |
| Time of Onset | No. of Cases |
| During pregnancy | 42 |
| During labour | 8 |
| During puerperium | 20 |
| Total | 70 |

It is believed that these figures support the view
that pregnancy in some way predisposes to the
development of a lumbar disc protrusion. It is
possible that postural stress during pregnancy and
mechanical stress during labour may lead to injury
of a lumbar intervertebral joint; further diminution
of lumbar muscle tone in the puerperium may
increase the risks of such injury from minor stress.
A further possible factor, discussed in a previous
paper (O'Connell, 1944), is a hormonal one. A
secretion of the corpus luteum, relaxin, has been
thought to be responsible for the increased mobility
of the sacro-iliac and pubic symphysal joints during
pregnancy. It seems possible that this secretion
might also induce changes in the ligamentous
coverings of other joints, including the lumbar
intervertebral ones, and that such changes might
render these joints more vulnerable to stress.

Muscular weakness in the affected lower limb is a
well-recognized complication of lumbar disc pro-
trusions. At times, in spite of the presence of
hypotonia and atrophy of the posterior crural
muscles, there is no demonstrable paresis. More
often a weakness of certain toe movements is
demonstrable and in a proportion of cases a severe
paresis or a paralysis of movement at the ankle and
perhaps knee and hip joints occurs. In Table VII
the incidence and severity of a defect of power in
the whole group of 347 female patients in whom
the presence of a lumbar disc protrusion has been
surgically proven is shown. Such a defect was
present to a greater or lesser extent in 69%. It
involved movements at joints proximal to the toes
and was moderate or severe in degree in 19% of
the whole group. Table VII also indicates the
frequency and severity of loss of muscular power in
36 cases of disc protrusion occurring in pregnancy.

| Table VII |
| INCIDENCE OF LOSS OF MUSCLE POWER |
| In whole group of 347 cases |
| No muscle weakness | 106 (31%) |
| Minimal muscle weakness | 174 (50%) |
| Moderate muscle weakness | 54 (15%) |
| Severe muscle weakness | 13 (4%) |
| Total | 347 (100%) |
| In 36 cases in which pre-operative symptoms developed in pregnancy |
| No muscle weakness | 5 (14%) |
| Minimal muscle weakness | 19 (53%) |
| Moderate muscle weakness | 9 (25%) |
| Severe muscle weakness | 3 (8%) |
| Total | 36 (100%) |

These 36 patients had symptoms of a protrusion
arise in relation to pregnancy and persist to the
time of examination; in the remaining 34 of the 70
patients in whom symptoms of a disc injury arose
in pregnancy, a history of such symptoms was obtained
but spontaneous recovery took place, the patient
being later operated upon for a recurrence of
symptoms not associated with pregnancy. A motor
defect was present in 86% of the 36 cases in question
and involved power at proximal joints in 33%.
These figures indicate that lower limb paresis occurs
in association with the lumbar disc protrusions of
pregnancy and suggest that it may be more common
and more severe than is the case when protrusions
occur in non-pregnant women.

In Table VIII significant features of the case
histories of the three patients who developed the
most severe motor defect are set out. In each of
them the loss of power itself occasioned well-marked disability. The findings in the nine patients who developed a weakness, less severe than in the previous group, yet of considerably greater severity than is usually encountered in cases of lumbar disc protrusion, are set out in Table IX. The time of onset of the muscular weakness in these 12 patients in whom it was either severe or moderately severe is of interest. In the three most severely affected

### Table VIII

<table>
<thead>
<tr>
<th>Onset of pain</th>
<th>M.W. Aged 27 Years</th>
<th>D.R. Aged 32 Years</th>
<th>E.G. Aged 27 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakness first noticed</td>
<td>Low back and sciatic pain 2 days before labour</td>
<td>Low back: pregnancy, sciatic 10th day puerperium</td>
<td>Sciatic: 7th day puerperium low back; later</td>
</tr>
<tr>
<td>Muscles affected</td>
<td>7th day puerperium</td>
<td>Severe paresis, toe movement</td>
<td>Two hours after labour</td>
</tr>
<tr>
<td>Level of protrusion</td>
<td>Paralysis: dorsiflexion foot and toes; eversion ankle</td>
<td>Severe paresis: all ankle and toe movement apart plantar flexion ankle</td>
<td>Severe paresis: toe and ankle movement apart plantar flexion ankle</td>
</tr>
<tr>
<td>Result</td>
<td>L.5, S.1; Wt. 80 g.</td>
<td>L.4-5; Wt. 4-8 g.</td>
<td>L.5, S.1; Wt. 1-8 g.</td>
</tr>
<tr>
<td>Pain</td>
<td>Pain relieved, some residual weakness 5 years</td>
<td>Pain relieved, power recovered</td>
<td>Pain relieved, power improved (2 years)</td>
</tr>
</tbody>
</table>

### Table IX

<table>
<thead>
<tr>
<th>Onset of pain</th>
<th>Pregnancy in 3 cases</th>
<th>Puerperium in 6 cases</th>
<th>Puerperium in 3 cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of weakness</td>
<td>Puerperium</td>
<td>Not determined in 5 cases</td>
<td>Puerperium in 1 case</td>
</tr>
<tr>
<td>Movements affected</td>
<td>Dorsiflexion ankle in 7 cases</td>
<td>Eversion ankle in 6 cases</td>
<td>Inversion ankle in 4 cases</td>
</tr>
<tr>
<td></td>
<td>Eversion ankle in 6 cases</td>
<td>Inversion ankle in 4 cases</td>
<td>Plantar flexion ankle in 2 cases</td>
</tr>
<tr>
<td>Level of protrusion</td>
<td>L.4-5</td>
<td>L.5, S.1</td>
<td>Average weight 3 g.</td>
</tr>
<tr>
<td>Result</td>
<td>Rapid recovery of power in all cases</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

...and Tables VIII and IX it will be seen that the movements most commonly and most severely affected in this series of cases were dorsiflexion and eversion of the ankle joint, precisely the same as those reported in the literature as occurring after lumbo-sacral plexus injury in childbirth.

Review of this material suggests that, contrary to some published opinions (King, 1950), the association of pregnancy and a lumbar intervertebral disc protrusion is not uncommon. Indeed it is believed that the figures lend support to the view that pregnancy is an aetiological factor in the development of lumbar disc protrusions in women. Moreover, since such a protrusion may occur in the early puerperium and produce a severe lower limb paresis, the lesion must be regarded as an established cause of certain obstetric lumbo-sacral palsies. It has been stated that the differentiation of pareses due to plexus injury from those due to disc protrusions should present little difficulty (King, 1950). While this may frequently be the case, experience suggests that it is not invariably so. Clearly when paralysis and sensory loss develop with little or no associated pain and without spinal signs or evidence of tension in the roots of the sciatic nerve, the diagnosis is likely to be one of a plexus injury during labour.

When, on the contrary, the neurological defect is associated with much pain and with well-marked spinal and tension signs, the diagnosis of a lumbar disc protrusion is the likely one. However, pain is recorded as having been severe in some cases considered to be examples of plexus injury, and it is a common experience that when a lumbar disc protrusion causes severe nerve injury and paralysis, pain due to it may greatly diminish. As an illustration of the diagnostic difficulty that may arise, the paper of Tillman (1935) may be mentioned. This author gives the records of eight patients in whom he believed plexus injury had occurred. In six of these pain was a major feature and developed either before labour (one case) or during the first 10 days of the puerperium. In two of the six patients no actual weakness is described and it appears that pain was the major cause of disability. Although in
the remaining four patients well-marked muscular weakness was present, pain was a persistent feature, and it seems possible that a disc protrusion rather than a plexus injury had occurred in some of the cases of the series. In several personal cases no firm conclusion as to the cause of the obstetric lumbo-sacral palsy has been reached. Among these was a patient who developed a clear-cut picture of a lumbar disc protrusion during one pregnancy, recovered rapidly after delivery, and some years later was seen with a severe paresis of a lower limb after forceps delivery of another child. It is at least possible that the pain in one pregnancy and the paralysis after the other were occasioned by the same cause, a lumbar disc protrusion.

Summary

The records of 347 consecutive women with surgically proven lumbar intervertebral disc protrusions have been reviewed.

Of those patients in the series who had borne one or more children, 39% developed symptoms of a disc protrusion in pregnancy or the puerperium. This indicates that pregnancy is an aetiological factor in the development of lumbar disc protrusions in women.

In 12 of the 70 patients developing symptoms of a disc protrusion in pregnancy a lower limb paresis of severe or moderate degree occurred and involved the ankle and occasionally the knee and hip joints. In a quarter of these patients the paresis developed in the early puerperium.

The possibility of a lumbar disc protrusion being responsible for a maternal obstetrical palsy should be considered before the defect is assumed to result from lumbo-sacral plexus injury.

REFERENCES

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