PREGNANCY IN A PARALYSED POST-POLIOMYELITIC PATIENT

**A Case Report and Review of the Literature with
Recommendations for the Management of Future Cases**

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SUMMARY: The management of a pregnancy in a patient with respiratory insufficiency as a result of childhood poliomyelitis is described. Relevant literature is reviewed, and recommendations made, for the management of similar cases.

Introduction

In a recent editorial¹, concern was expressed at the overall decline in childhood immunisation in general, and in particular, that against poliomyelitis. It was the contemporaneous publication of this article, with the occurrence of a pregnancy in a patient of the Author's who had survived paralytic poliomyelitis, albeit virtually totally incapacitated, that provided the stimulus to review the literature and thereby to suggest guidelines for the management of similar cases in the future.

Case report

The patient, who was aged 30 years and who had previously had a spontaneous complete miscarriage at 12 weeks, was seen in the ante natal booking clinic at 10 weeks gestation in her second pregnancy. When five years of age she contracted paralytic poliomyelitis and required tank ventilation for six months. Until the age of nine years she was able to walk short distances with the aid of calipers but thereafter her kyphoscoliosis precluded mobility. She underwent spinal bone grafting at 10 years of age, since when she had been totally confined to a wheel-chair. Although her respiratory reserve was severely restricted, she had experienced little respiratory difficulties apart from annual episodes of acute bronchitis which had always responded rapidly to physiotherapy and antibiotic administration.

On examination she appeared pale, anxious, weighed 30.4 kg and was 145 cm tall. Although acyanotic, early finger clubbing was noted. Her respiratory rate was 30 per minute and chest expansion was negligible. She had gross wasting of her inter-costal musculature. No other abnormalities were noted on examination of her respiratory or cardiovascular systems. All her limbs were severely wasted and deformed and showed the characteristic vaso-motor changes of poliomyelitis. In addition she had bilateral fixed flexion deformities of her hips and a moderate

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degree of left sided kyphoscoliosis. The uterine fundus was palpable per abdomen and bimanual examination confirmed a pregnant uterus compatible in size with her gestation by dates. Clinical assessment of the pelvis revealed a moderate reduction in all diameters but particularly those of the pelvic outlet. The true conjugate measured 9.5 cm.

In view of the unfavourable pelvic architecture, skeletal deformities and the inevitable deterioration in cardio-respiratory reserve as the pregnancy progressed, delivery by elective caesarean section was decided upon as soon as fetal lung maturity could be confirmed by amniocentesis. The results of all routine investigations were satisfactory. The haemoglobin concentration was 12.0 g/dl.

The pregnancy was uneventful until the thirtieth week when the patient was seen to be dyspnoeic at rest. She was admitted to hospital for further assessment and rest. The only abnormality detected at this time was a haemoglobin concentration of 10.2 g/dl and this was treated by increasing her oral iron therapy to 1.2 g daily.

A week following her admission uterine contractions commenced accompanied by a scanty "show", but without rupture of the membranes. The premature labour responded well to Indomethacin administered by oral and rectal routes and Isoxsuprine by intravenous infusion, with cessation of uterine activity after 11 hours. Four units of frozen fresh packed cells were also administered.

In consultation with a consultant anaesthetist it was decided that the dyspnoea was mainly due to encroachment by the progressing pregnancy on a severely limited cardio-respiratory reserve and that Cuirass assistance to respiration should be commenced. Due to the patient's skeletal deformities however, an air tight seal could not be obtained around the breast shield and this method was abandoned in favour of tank ventilation.

On a programme of intermittent tank ventilation and active chest physiotherapy, the patient's condition improved dramatically. At 35 weeks however, a moderate increase in the respiratory rate to 40 per minute was noted, associated with a fall in the PO_2 to 8 Kpa (60 mm Hg). Because it was felt that termination of the pregnancy in the maternal interest would be necessary in the near future, amniocentesis was performed to assess fetal pulmonary maturity. The lecithin/sphingomyelin ratio was 2.2 to 1.0. Subsequently the patient was delivered by elective lower segment caesarean section on 5 August 1975 of a live male infant weighing 2.046 kg, whose one minute Apgar score was eight and whose further progress was entirely satisfactory.

Apart from a single short lived period of respiratory failure in the immediate postoperative period characterised by PO_2 and PCO_2 levels of 5.33 kPa and 8.66 kPa (40 and 65 mm Hg) respectively, the patient recovered completely and was discharged from hospital on the 12th postoperative day.

At the postnatal visit, six weeks postpartum, both mother and infant were reviewed. The patient was asymptomatic and felt she had fully recovered from the effects of her pregnancy. Physical examination confirmed this view. Her infant too, was clearly thriving and gaining weight satisfactorily.

Discussion

Poliomyelitis is now a rarity in Britain, largely due to successful immunisation programmes; indeed most recently qualified doctors have never seen a patient suffering from this lethal and crippling disease. However, in the period 1951 to 1955, over 4,000 cases of poliomyelitis were notified in the United Kingdom (UK). In 1973, although only nine cases were notified in the UK, the weekly epidemiological record of the World Health Organisation (WHO)², records 500 cases from Turkey, 93 from Algiers and 83 from Spain—countries increasing in popularity amongst British holidaymakers. It is probably Pakistan however, which poses the biggest threat to the health of the country at large with regard to the re-emergence of poliomyelitis. The WHO records 748 notifications from this country², but the true figure is undoubtedly much higher. Every year many Pakistanis living in Britain return to their native country on holiday taking with them their children, who, by virtue of their birth in Britain, are unlikely to have any naturally acquired immunity to poliomyelitis.

Largely because of the recent adverse publicity principally directed against pertussis immunisation, there has been a significant fall in the number of children vaccinated against infectious diseases. It is currently estimated that 20 per cent of all school children have never been immunised against poliomyelitis, whilst a much higher proportion lack full immunity³. A significant increase in the incidence of pertussis in 1974 has been attributed to the decline in immunisation against this infection. It is probable, therefore, that for similar reasons poliomyelitis will become more prevalent.

The successful management of pregnancy in patients suffering from poliomyelitis or its aftermath, presents many difficulties due mainly to two factors:—

- a. The complete lack of experience in dealing with such cases, as reflected by the paucity of case reports in the literature and,
- b. the physical and psychological problems involved in dealing with paralysed, recumbent and ventilated patients over long periods.

Acute poliomyelitis complicating pregnancy is a rare occurrence. Aycock⁴ calculated that the expectancy of paralytic poliomyelitis in pregnancy was less than 1 in 1,000 cases in poliomyelitis and 1 in 50,000 pregnancies. Brahdy⁵ found that four per cent of all poliomyelitis patients were respirator cases. By applying these results generally therefore only 1 in 1,250,000 pregnant women approximately would in theory require respiration.

Peelen⁶ collated data from 29 reported cases of poliomyelitis in pregnancy, and contributed two cases of his own. Gillespie⁷, in his paper describes caesarean section during the acute stage of paralytic poliomyelitis following his failure to arrest premature labour with large doses of progesterone and barbiturates. Although the mother survived, the baby died in the immediate neonatal period from intracranial haemorrhage. Spishakoff *et al*⁸, describe a premature spontaneous delivery in a gravely ill patient, managed by the alternating use of a respirator and ventilator. They also describe the insurmountable difficulties of forceps application and regional block analgesia.

Hornung and Creutzfeldt⁹, reported a maternal death from respiratory failure

following caesarean section performed at 37 weeks on a paralysed poliomyelitic patient. A respirator was not used. Freeth¹⁰, reports the onset of paralytic poliomyelitis in a patient at term and proposes that the rhythmical pressure changes of the respirator stimulated the uterus to induce labour. Her patient was delivered by caesarean section, both patient and baby making good recoveries. She also draws attention to the great nursing difficulties associated with these patients, Quinlivan and Kushmerick¹¹, described a patient with acute bulbo-spinal poliomyelitis delivered by caesarian section and by reviewing a further 626 cases determine the incidence of, and indications for, caesarean section during the acute phase of poliomyelitis.

Most writers agree that poliomyelitis has an adverse influence on pregnancy. It is well known that bladder paralysis with cystitis and ascending infection may lead to pyelonephritis. Renal calculi may develop. Impaired bowel function with faecal impaction and marked distension pressing on a paralysed diaphragm, may cause further hypoxia, whilst the frequent administration of enemas may induce premature labour. Furthermore pelvic distortion is common. Kleinberg and Herwitz¹², found radiological evidence of some degree of pelvic asymmetry in 79.21 per cent of a series of 101 paralysed pregnant women, although the degree of contraction and flattening was generally slight.

Cushing¹³, was the first to establish the myogenic as opposed to the neurogenic basis for automatic, rhythmic, uterine contraction. He also observed that completion of the first stage of labour was possible even when the autonomic nerve supply to the uterus had been extirpated. However, following full cervical dilation and descent of the presenting part to the level of the pelvic floor, complete paralysis of voluntary muscles, with absence of the "secondary forces of labour", definitely hinders progress in the second stage and invariably, instrumental assistance which is frequently difficult and hazardous, is required to achieve delivery per vaginam. Furthermore, bladder paralysis and distension may interfere with normal third stage contractions and thereby increase the possibility of postpartum haemorrhage.

Largely, for these reasons, pre-term delivery, if not spontaneous in onset is the usual practice of obstetricians with experience of this condition. Thus Helms¹⁴, recommends premature delivery when respiration is hindered in the paralytic patient. Morrow and Luria¹⁵, agree with this view and recommend caesarian section if the increasing uterine size hampers respiration. McGoogan¹⁶, is of the same opinion and states "... emptying of the uterus should be done if the enlargement of the uterus is sufficient to encroach upon the diaphragm. This should be done to improve the patient's lung aeration and to postpone the onset of fatal respiratory paralysis", a view also shared by Peelen⁶. Brahdry and Lenarsky¹⁷, believe that "uncomplicated poliomyelitis, excluding respiratory paralysis, is not an indication for the interruption of pregnancy." Likewise, Lewin¹⁸, states "Interruption of the pregnancy should not be undertaken except in those circumstances in which the uterus encroaches upon the diaphragm and there is diaphragmatic paralysis, or in cases of severe cystitis or other complications". Strauss and Bluestone¹⁹, in a case remarkably similar to the Author's,

describe delivery of a paralytic post-poliomyelitis patient by caesarean section at 35 weeks gestation. They believe that patients with paralysis of the muscles below the clavicles "should be spared the added strain of labour".

Eventually the practical problems of method and timing of delivery confront the obstetrician. Three possibilities exist:—

1. Spontaneous delivery. 2. Instrumental vaginal delivery. 3. Abdominal caesarean section.

Although it is possible to achieve spontaneous vaginal delivery within the confines of a respirator, there is little scope for aseptic technique or controlled delivery because of the size and position of the port holes. For similar reasons, episiotomy, instrumental delivery, breech extraction, control of postpartum haemorrhage and repair of genital tract laceration are impossible. Furthermore delivery within a respirator may be positively harmful to the emerging infant, by subjecting him to sudden and profound changes in the atmospheric pressure of his immediate environment, and thereby possibly causing air embolism, pulmonary, or intracranial haemorrhage.

Other means of artificial respiration during labour such as the Cuirass respirator might permit vaginal delivery but these suffer from the serious disadvantage of having a fixed respiratory rate, this preventing synchronisation of breathing and bearing down patterns.

Caesarean section provides a quick, certain and relatively safe means of terminating both term and pre-term pregnancies in these patients. The morbidity and mortality associated with failed induction, prolonged labour and intra-uterine infection are avoided. It is also undoubtedly the safer method of delivery in cases where pelvic deformities secondary to muscle paralysis might prolong labour and thereby embarrass cardiorespiratory function.

Recommendations

What recommendations therefore may be made for the management of pregnancies in patients paralysed as a result of Poliomyelitis?

1. The importance of early attendance at antenatal booking clinic cannot be over emphasised. This allows an early assessment of any incapacity and establishes base line values for such parameters as respiratory and renal function.

2. Regular and frequent medical supervision to detect as quickly as possible any decompensation in cardiorespiratory reserve.

3. Careful attention to bowel and bladder function. Urinary tract infection must be treated promptly and energetically if renal damage is to be minimised. Of no less importance is the establishment of a regular bowel habit by eating a well balanced diet and the judicious use of, where necessary, a gentle laxative.

4. The maintenance of as high a haemoglobin level as possible, if necessary by transfusion of compatible packed cells where oral haematinics have been unsuccessful.

5. Chest physiotherapy and deep breathing exercises are vitally important and may defer the need for assisted respiration.

6. Admission to hospital early in the third trimester, or beforehand if

indicated, for further assessment, intensive physiotherapy and patient familiarisation with staff and equipment.

7. Involvement of Social Worker and Occupational Therapist where appropriate, in the case. This is particularly important when modifications to the patient's home surroundings by such means as the installation of labour saving devices or ramps in lieu of stairs, are necessary and which may be partially funded by the local authority.

8. The commencement of assisted respiration when required.

9. Delivery should be by Elective Lower Segment operation and should ideally be performed between the 36th and 38th week of pregnancy depending on the degree of respiratory embarrassment.

10. Fetal lung maturity should be assessed by amniocentesis prior to elective pre-term delivery. When an immature result is obtained, delivery should be deferred if possible until a more favourable result is obtained, or at least until a course of steroid therapy has been administered to the mother.

11. Finally, these patients require particular care and encouragement during the puerperium if they are successfully to adjust themselves to their new role as mothers with healthy, lively and dependent offspring.

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