

MULTIPLE PREGNANCY FOLLOWING AMENORRHOEA

(After deep X-ray therapy to the sacroiliac joints)

by

Y. PINTO DO ROSARIO,* M.D. (Bom.)

This nuclear age with its immense strides in atomic and nuclear research, while opening new fields in progress, also brings with it the question of genetic effects produced by radiation on the human gonads and on the future generation.

Effective radiation either kills the germ cells or causes mutation of genes by chromosomal breakage. Translocation of chromosomal fragments may, however, lead to increased gene mutation and hence give rise to malformation in the next generation.

Pregnancy following deep x-ray irradiation is uncommon and carries with it the same problems as "fall out" following nuclear test bombs etc. The following case is published as not only being uncommon but also for the problems it may create in the future.

Case Report

Mrs. S.I.S. No. 25318, 30 years, para III, gravida IV, in her 9th month of pregnancy, was admitted in Safdarjang Hospital, on 9-7-66 with a history of amenorrhoea for 4 years and complaining of acute attacks of pain in the right leg and back for 15 days and oedema of feet for a week. The pain

dated back to 7 years with acute exacerbations off and on.

Previous menstrual cycle 3-4/6-75 days irregular. Secondary amenorrhoea since 1962 following irradiation by deep x-rays.

History of spotting only on 20th September '65.

Obstetric history. Married at the age of 12 years.

1st 1955 — II years. FTND, male, died after 5 months, 2nd 1959 — 7 years. FTND male, healthy, 3rd 1962 — 4 years. FTND female, healthy.

Past history

Patient had acute shooting pain in the back radiating to the posterior aspect of the right thigh and leg following her second delivery in 1959. The attack lasted for a fortnight but patient continued having pain for 6 months. There was no restriction of movements.

In 1962, patient had her third delivery and a month later the same pain recurred with greater severity. During this attack she was seen by a specialist and his notes say that the patient had flexion deformity of the spine with pain and tenderness in the sacro-iliac joints and pain in and stiffness of cervical and lumbar spines. Hip movements were restricted.

X-ray report on 26-11-62, "sacro-iliac joints are hazy and may be due to ankylosing spondylitis". Treatment given was Deltacortyl for 10 days and short wave diathermy 12 sittings.

As she was not relieved, the radio-therapist, in conjunction with the orthopaedic surgeon, gave her deep x-rays starting from 18-12-62. Patient had a total dose of 1500 r Incident on skin over 3 weeks, given every 3rd day. The treatment area:

*Specialist (Cbst. & Gyn.), Safdarjang Hospital, New Delhi.

Received for publication on 31-8-66.

Whole spine including sacroiliac joint, field size 15 x 10 over the sacroiliac joint. Average dose to the ovary 750 r which was over 3 weeks.

Patient was then 25 years of age and had her third delivery 6 months previously. She recovered her movements completely and was well till 20-6-64, when she had another attack of pain for which she was given tablet Butazolidins for 3 weeks and tablet Decadron for 2 weeks. She also had physiotherapy.

Following the deep x-ray therapy, from 1962 onwards, patient, however, developed secondary amenorrhoea and the records show that the abdomen was doughy, the uterus was anteverted and anteфлекed, and normal in size; fornices clear.

18-9-64, Injections of oestroprogyn 1 daily were given for 3 days. One year later on 20th September 1965 the patient had slight spotting. On 6th January 1966 she was told that she was 12 weeks pregnant and late in January she felt foetal movements. On May 16th 1966 she was seen for the first time at the Safdarjang Hospital Antenatal Clinic and was found to be 34 weeks pregnant. On 9th July 1966, she was admitted for severe pain in the back and right leg and oedema of feet. Symptomatic treatment was instituted and the oedema subsided, though the pain was not much relieved.

Haemoglobin was 10.4 grms%. Peripheral smear and blood picture normal. Blood pressure 110/80.

Patient delivered normally on 20-7-66, of uniovular twins weighing 3450 gm and 2750 gm. The first presented by vertex and the second by the breech. The placenta weighed 700 gm. The labour lasted for 4 hrs 10 mts.

The babies were examined by a pediatrician. No apparent congenital malformation was detected. The postnatal period was uneventful.

The first child's haemoglobin was 13.8 gm% and the second child's was 13 gm%; peripheral smears of both were normal.

Discussion

Cases of pregnancy following deep irradiation of the pelvis are rare:

In this case not only did the patient receive 1500 r with 750 r to the ovaries, she also developed amenorrhoea from 1962, following the irradiation. The interesting feature is the twin pregnancy following this 4 year period of amenorrhoea. The babies at birth showed no physical and apparent malformation and the blood pictures were normal. When irradiation is given for non-malignant conditions, there are three significant factors which play an important part.

- (a) The dose of irradiation given.
- (b) The time period over which it is given.
- (c) The age of the patient.

Dosage

Moss working on rabbits stated that with ionizing irradiation the first cell to suffer is the ovum and here "The ovum in the young follicle is more susceptible to direct radiation damage than the ovum of the mature follicle". However, he adds that "even after a single dose of 1200 r some of the primitive follicles recover and later resume the process of maturation".

Recent work by Buckton, Jacob and Court Brown and Doll on patients with ankylosing spondylitis treated with a skin dose of 1500 r over the sacroiliac joints shows various types of anomalies and their persistence in circulating leukocytes for over 20 years giving a clue to the fact that radiation induces persistent chromosome aberrations.

Time period

Evidence has been found to show that the same dose given over a longer period causes less harm and

hence spacing out the irradiation will certainly play a significant part.

Age of the patient

A woman in the menopausal age will certainly require a smaller dose than a younger woman; 200 r in a young person will produce temporary arrest of menses, while 1200-2000 r in 1-2 weeks is necessary for permanent destruction of ova and prevention of oogenesis and menstruation. In an older woman 400 to 500 r is sufficient.

Damage to the off-spring

Chromosomal breakage and translocation may or may not produce congenital malformations. The mutations are recessive and their effects may or may not be seen on future generations.

The incidence of leukaemias and malignancies in childhood as a possibility, noted by some and refuted by others, is also thought-provoking, and cannot be discounted especially as it involves the question of mutations affecting subsequent generations.

In this case the woman was young, about 25 years of age, when she was irradiated; the dose as reported by the radiologist was 750 r to the ovary given over a period of 3 weeks. That the irradiation affected her ovaries was quite probable seeing the period of amenorrhoea which followed. What probably helped is the dosage period over which it was given and her age which, while producing temporary arrest of menstruation and oogenesis, was not sufficient to produce permanent destruction. The follicles could have recovered and proceeded to maturation. However,

Peck, McGreer, Kretzschman and Brown in 1940 tell of administration of 600-1200 r to 334 patients and conclude that 625-749 r is sufficient to cause artificial menopause irrespective of the age of the patient.

Mathews also discusses 874 women whose ovaries were irradiated; 139 became pregnant and 22 had normal labours. Gans, Bahay and Levi irradiated the remaining ovary of an 18½ years old girl with dysgerminoma, giving her 1740 r over 2 years. She became pregnant after 10 years.

The future of both the mother and the babies would be interesting to follow and though this case was not irradiated with the object of stimulating the ovaries but for a surgical condition, one cannot help but agree with the second report of the Medical Research Council Committee, which noted that "the induction of temporary menopause by irradiation cannot be justified".

In this case the question also arises if the twinning process could be a result of irradiation or should one regard it as normal.

The future menstrual history of the woman should prove interesting and the blood picture of the babies and of their children will be an interesting subject for research.

Summary

A case of multiple pregnancy following deep x-ray irradiation and amenorrhoea is discussed. These cases are not common and the ultimate future of the babies is a subject of interest.

Acknowledgements

I thank Col. R. D. Ayyar, F.R.C.S.,

Medical Superintendent, Safdarjang Hospital, New Delhi for permission to publish this case.

References

1. Buckton, K. E., Jacobs, P. A., Court Brown, W. M. and Doll, R.: *Lancet*. 2: 676, 1962.
2. Court Brown, W. M., Doll, R. and Hill, A. B.: *Brit. Med. J.* 2: 1539, 1960.
3. Gans, B., Bahary, C. and Devie, B.: *Obst. & Gynec.* 22: 596, 1963. Quoted by Zuckerman S. *Clinical Radiology*. 16: 1, 1965.
4. Lewis, T. L. T.: *Brit. Med. J.* 2: 1551, 1960.
5. Mackay, D. J. and Garrey, M. M.: *Lancet*. 1: 720, 1962.
6. Mathews, H. M.: *Surg. Gynec. & Obst.* 38: 383, 1924. Quoted by Zuckerman S., *Clinical Radiology*. 16: 1, 1965.
7. Moss, W. T.: *Therapeutic Radiology*: 1: St. Louis, 1959, The C. V. Mosby Co., p. 292.
8. Peck, W. S., McGreer, J. T., Kretzschman, N. R. and Brown, W. E.: *Radiology*: 34, 165, 1940, quoted by Zuckerman S., *Clinical Radiology*. 16: 1, 1965.
9. *Radiological Hazards to Patients (1960)*. A second report to the Medical Research Council Cmmd 1225 HM Stationery Office — Quoted by Mackay, D. J. and Garrey, M. M.: *Lancet*. 1: 720, 1962.
10. Zuckermann, S.: *Clinical Radiology*. 16: 1, 1965.