Full Term Pregnancy and Successful Delivery in a Patient on Chronic Haemodialysis

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In the 'Report on regular dialysis treatment in Europe' for 1970, by Drukker et al, as in the previous literature, no mention was made of full term pregnancies observed in women undergoing regular dialysis treatment. Herwig et al (1965), Bower and Orme et al (1968) submitted pregnant patients with advanced renal disease to haemodialysis, during the last weeks of pregnancy. In this way it was possible to prolong pregnancy and to obtain viable and healthy children. We think it worth while to report what may be the first case of a female patient undergoing regular dialysis treatment, conceiving and bringing to full term a perfectly normal pregnancy, and giving birth to a viable and healthy child.

CASE REPORT

Previous history

BG is a 35 years old woman. Albuminuria was first noted at the age of 18. She married at 23 and had two full term pregnancies at the ages of 24 and 26. The first appearance of hypertension, oedema and uraemia, indicating chronic renal disease was at the age of 28. Chronic glomerulonephritis with progressive renal failure was diagnosed. The patient was observed by us for the first time in April 1967; she presented the picture of irreversible renal failure. Endogenous creatinine clearance was at that time 9.2 ml/min.*

Regular dialysis treatment was started on 9/5/1967 with a two-layer Kill dialyser for a total of 24 hours per week. During the following three years of treatment no particular problems arose: rehabilitation was complete and she was able to work at normal activity with no need of special care. At the onset of treatment, the patient had been amenorrhoiec for three months; regular menstruation reappeared from May 1969.

* Unfortunately, data on the GFR during pregnancy three years later are not given (see discussion: Editor's note)
The pregnancy

In January 1970 the patient conceived. She did not allow termination of the pregnancy, and, because of her excellent general condition, perfect mental balance and her expressed wishes, we decided to try bringing the pregnancy to its full term. The patient was supervised closely and twice weekly dialysis for a total of 24 hours each week was carried out. We contemplated raising the number of haemodialyses to three or four times a week but this was not found necessary. Pre-dialysis azotemic values went from 67 mg/100ml in the first month of pregnancy to 97 mg/100ml at the ninth. (Figure 1)

![Graph showing pre-dialysis BUN values (mg/ml) during pregnancy](image)

Figure 1. Pre-dialysis BUN values (mg/ml) during pregnancy

We also noticed a slight increase in creatinine values, which increased from 8.9 to 9.7 mg/100ml. Uric acid values also presented a slight increase (an average 20%). From the third month of pregnancy, a downward tendency was observed in the haematocrit values, necessitating repeated blood transfusions, especially during the 5th, 6th, 7th and 8th month. (Figure 2)

No significant changes appeared in the serum calcium and phosphate values, but an important increase in serum alkaline phosphatase was noticed during the last three months (from 1.4 to 4.7 Bodansky units/ml). Electrolytic balance was normal during the whole pregnancy. Average weight gain between dialysis, before and during pregnancy was 1 kg.

With careful supervision of the blood pressure a progressive weight increase (10 kg) was allowed, as for normal pregnancy in a healthy woman. The blood pressure remained unchanged. (Figure 3)

The patient continued haemodialysis as before, and was admitted to hospital only just before delivery, on the 22nd of September 1970. On the
24th of September, three days before the estimated date, the patient gave birth to a male child: the delivery was normal; complete dilatation of the cervix was present 6 hours after the onset of labour; delivery ended 20 minutes later.

The amniotic liquid was clear, expulsion of the placenta and blood losses
normal. On the following day the patient received a normal dialysis, and afterwards the normal bi-weekly treatment was resumed. Involution of the womb was normal. Lactation began on the third day, but for evident reasons was checked by magnesium sulphate and compressive bandaging of the breasts. The patient went home 13 days after delivery. In the two months following delivery all the above mentioned parameters were brought back to pre-pregnancy standards.

The child

At birth the child weighed 1.950 kg and was normal externally. The general condition was impaired by the presence of cyanosis, slight dyspnoea and diffuse tremors. The majority of humoral values in the child corresponded to those of the mother: BUN 75 mg/100ml, creatinine 8.4 mg/100ml, blood sugar 82 mg/100ml. Na 144 mEq/L, K 6.7 mEq/L. Blood count: red cells 6.8 million/mm³. White cells 10.800/mm³, haematocrit 55%, and haemoglobin 18.6 g/100ml.

![Graph showing weight and length of a baby](image)

**Figure 4.** The baby: weight and length during the first month and a half of life.

There was an intense initial polyuria which was balanced by appropriate infusions; after 8 hours BUN had fallen to 54 mg/100ml. On the following day it fell further to 33 mg/100ml. Creatinine was 2.5 mg/100ml, Na 143 mEq/L; K 3.9 mEq/L. After 48 hours BUN and creatinine were at normal levels. Slight icterus was present. The general condition was still somewhat impaired; the child was cyanotic and subject to apnoeic attacks. After the fifth day his condition improved rapidly and he was taking nourishment regularly. After an initial weight loss down to 1.600 kg, weight started in-
creasing steadily and the birth weight was regained after 18 days. After 30
days his weight was 2.450 kg. At discharge (November 11th 1970) his weight
was 3.200 kg. (Figure 4)

At present the mother is receiving regular haemodialysis treatment, as
before, and complete rehabilitation is maintained. At the age of 9 months
the child weighs 9.200 kg and is in excellent health.

SUMMARY

A 35 year old woman who had received regular dialysis treatment for three
years because of chronic glomerulonephritis, conceived and brought to full
term a pregnancy, giving birth to a viable and healthy child. No specific
clinical problems arose during pregnancy. The bi-weekly haemodialysis
programme with a Kiil dialyser was carried on during pregnancy. At nine
months of age the child is in good health and develops normally. The mother
continues with the regular dialysis treatment, with full rehabilitation.

REFERENCES

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OPEN DISCUSSION

MIGONE (Chairman): Thank you very much for your very interesting paper.
Is this case of pregnancy after several years of regular dialysis treatment
the only one in the world? I would like to ask if anyone from the floor has
seen anything like it?

A C KENNEDY (Glasgow): I think the Verona group deserve to be compli-
mented for two reasons, first of all for the successful outcome of the preg-
nancy in this patient, a very real achievement and one of the greatest interest;
to us all. The second reason I think they deserve compliments is that they
are able to put their patients onto regular dialysis when their creatinine
clearance is still 8 or 9 ml/min. I think this second point probably is the
reason for the successful outcome of the pregnancy in their case; and I
wonder if it is the policy in Verona to establish patients on regular dialysis
when they still have such (relatively speaking) large degree of their renal
function left?
GIONGO: When the patient was on dialysis she had a creatinine clearance of 9.2 but she had a BUN of about 200. She had a very severe peripheral neuropathy, she was anaemic and we decided to try haemodialysis treatment. Our usual indication is a clearance of about 5L/24 hours (= 3.5 ml/min Ed) but the clinical picture may be very important, enough to be the deciding factor.

S SHALDON (London): I would like to challenge Professor Kennedy’s statement that that was probably the reason why the patient had a successful pregnancy. I do not think he has a shred of evidence to support that hypothesis. I think what is more likely is that if the patient had had a lower creatinine clearance they would have required more dialysis and that is why with only twice weekly dialysis they were able to carry a patient who clearly was fitter and better on dialysis than off through a successful pregnancy. After all this is the purpose of chronic dialysis. I do not think you are correct in assuming that this lady would not have had the same outcome if her creatinine clearance had been zero and she had been dialysed four times a week.

KENNEDY: I think I really must reply to Dr Shaldon on this. I did not say it was the reason, I suggested the likelihood of this possibility. Secondly, I do not think the Chairman of the session, Professor Migone, has had a reply from the hall as to whether there is any other case of pregnancy on regular dialysis. Had the two things been unrelated I think somewhere in Europe or in the USA we would have had this kind of report before.

D OLIVER (Oxford): I would like to report briefly a second pregnancy in a dialysis patient who was receiving 3 ten-hour treatments a week. The patient has been on dialysis for 18 months. This is a 20 week pregnancy only diagnosed this week. We have come down in favour of Professor Kennedy’s view, and think that this woman’s renal function has improved considerably. Her initial renal failure was due to a combination of pyelonephritis, malignant hypertension and micro angiopathic haemolytic anaemia. I think the most crucial part of the pregnancy, the early gestation period, would appear to be impossible with a creatinine clearance of 5 ml/min, otherwise there would be more reports of this from meetings like this and in the literature. This woman is currently being aborted in Oxford, today or tomorrow, and we will report further on what her renal function is because we intend withholding dialysis for a period. This should answer this question or go towards answering it.

D N S KERR (Newcastle): I would certainly like to challenge that last suggestion. We have had three patients pregnant at Newcastle. They have all been
aborted at their own request. They got as far as between twelve and twenty weeks with creatinine clearances below 1 ml/min, so I think you could certainly get through early pregnancy. I still think it was a tremendous achievement to have got somebody to the end of pregnancy on dialysis.

S ROSEN (Leeds): We had a patient with a creatinine clearance also of less than 1 ml/min who became pregnant but she aborted spontaneously at 12 weeks. I might say that it was a bit difficult diagnosing pregnancy because as with many dialysis patients her menstrual periods were irregular. It was only when she developed other symptoms that we realised that she might be pregnant, but she quickly aborted after that.

W CATTELL (London): I think relevant to both what Professor Kennedy has said and what Dr Shaldon has said, that we have taken a patient with a creatinine clearance of 10 ml/min through pregnancy without dialysis. I think the argument that you require to dialyse patients with this degree of renal function to get successful pregnancies is not correct.

V BIANCHI (Ancona): Did you use a special diet for this patient?

GIONGO: No, she had an ordinary dialysis diet.