# Goodpasture's syndrome, haemodialysis and pregnancy

## Introduction

Goodpasture's syndrome is an immunological disorder characterized by pulmonary haemorrhage, glomerulonephritis and antiglomerular basement membrane (antiGBM) antibody. It is associated with high mortality and morbidity requiring long-term haemodialysis or renal transplant. Pregnancy is uncommon in women who require long-term haemodialysis, and carries high risk of fetal and maternal complications. The treatment modalities, i.e. immunosuppressive agents and haemodialysis, also pose difficult management issues during pregnancy.

Work undertaken by Haase et al (2005) has shown that the outcome of pregnancies in such patients on maintenance dialysis has markedly improved from approximately 20% live births during the 1980s to 40–100% surviving infants from a registry and case reports or series. Polyhydramnios, maternal hypertension and premature rupture of membrane are suspected to cause premature delivery. Shifts in acute fluid volume, electrolyte imbalance, and hypotension also could constitute major dialysis-related complications that impair the utero-placental circulation.

## Case Report

A 29-year-old Caucasian woman had been diagnosed with Goodpasture's syndrome 12 months previously. Her renal function did not recover, she required haemodialysis and was put on the transplant list. She developed amenorrhoea on haemodialysis. She was seen at 22 weeks gestation in her second pregnancy. She was counselled regarding the high risk of fetal and maternal complications. She was offered medical termination of pregnancy but decided to continue.

A management plan was devised aiming to maintain the health of the mother, allow growth of the fetus and to support the patient and her partner.

The plan included referral to a specialist obstetric unit. All drugs were evaluated and potentially dangerous medication, i.e. losartan, was stopped. Her haemodialysis was increased to six times a week (at least 24 h/week) to maintain a pre-dialysis urea of less than 16 mmol/litre. Her dialysate bicarbonate levels were reduced to prevent the usual post-dialysis alkalosis and avoid pre-dialysis acidosis. Intradialystic hypotension was avoided by careful fluid balance assessment and low ultrafiltration rates on dialysis, and post-dialysis hypercalcaemia was avoided by adjusting the dialysate calcium concentration. Hypocalcaemia was avoided by close monitoring of calcium and vitamin D levels and ensuring adequate doses of calcium and alfacalcidol. Hypertension was controlled with a safe antihypertensive (methyldopa), her haemoglobin was maintained between 10 and 11 g/dl with iron and erythropoietin and adequate nutrition with increased calorie and protein intake, water-soluble vitamins (B and C), and folic acid. Fetal growth and liquor volumes were monitored by regular ultrasound scanning.

At 24 weeks methyldopa 250 mg twice a day was started to control her blood pressure. Her growth scan at 24 and 26 weeks was satisfactory. At 27 weeks and 2 days she was admitted with severe epigastric pain. There were no other features of pre-eclampsia. She was given a course of betamethasone for fetal lung maturity. Two days later tests revealed a low platelet count ($67x10^9$/litre; normal value 150–$400x10^9$/litre) and high alanine aminotransferase (ALT) levels (113 iu/litre; 0–40 iu/litre). The next day a repeat test showed platelet count of $47x10^9$/litre and an ALT level of 415 iu/litre. A working diagnosis of HELLP (haemolysis, elevated liver enzyme and low platelet) syndrome was made. The multidisciplinary team decided to deliver her electively by caesarean section the next day. A healthy baby boy weighing 540 g was delivered without any difficulty. She recovered well after the operation and was back on haemodialysis three times a week. The baby was doing well at 6 months of age.

The authors report an unusual case of Goodpasture's syndrome on haemodialysis and pregnancy requiring delivery for HELLP (haemolysis, elevated liver enzyme and low platelet) syndrome with successful outcome. The potential complications of currently applied treatment are also discussed.

## Discussion

In Goodpasture's syndrome, antibodies are formed against the glomerular and alveolar basement membranes. Women on long-term haemodialysis rarely conceive. With the advances in the technique of haemodialysis therapy, patients have a better chance to conceive because of the resumption of physiological function of the hypothalamic–pituitary–ovarian axis.

Chen et al (1999) found elevated maternal serum human chorionic gonadotrophin levels in patients undergoing haemodialysis giving high false positive results for Down's syndrome.

Fetal growth retardation and prematurity remains the main risk for neonatal death and morbidity.

Polyhydramnios is associated with the frequent and rapid removal of solutes during haemodialysis. Haemodialysis frequency should be increased to improve the clinical outcome.

Hypertension especially worsens in the third trimester. As shown by Chao et al (2002) 13 out of 19 pregnant women undergoing dialysis became hypertensive. The differential diagnosis between superimposed pre-eclampsia and exacerbation of hypertension is very difficult in the presence of renal failure. Angiotensin-con-

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verting enzyme inhibitors and angiotensin-receptor blockers are contraindicated in pregnancy.

Doubling of the erythropoietin dose is usually needed to produce enough red cells for pregnancy and reverse the drop in haematocrit.

Initiation of daily haemodialysis allowed the authors to liberalize the diet with higher protein content. Water-soluble vitamins are lost during dialysis and require supplementation. Pregnant patients on dialysis require up to 0.8 mg/day of folate to prevent neural tube defects. Pregnant dialysis patients on a 2.5 mEq/litre calcium dialysate usually require oral calcium supplements of 2 g/day.

Chao et al (2002) and Haase et al (2005) have shown the outcome of pregnancy on long-term haemodialysis with 60% and 100% neonatal survival. Long-term follow up of surviving children and mothers after delivery is required.

## Conclusions

The incidence of pregnancy and successful outcome in patients on dialysis has increased in recent years; however, fetal and maternal morbidity and mortality remain significant. Appropriate contraceptive and pre-pregnancy counselling should be offered to dialysis patients of childbearing age. For women on haemodialysis who want to conceive or continue with the pregnancy, multidisciplinary teamwork between the obstetrician, nephrologist, dietician, anaesthetist and neonatologist is mandatory for optimum maternal and fetal care. **BJHM**

Chao AS, Jeng-Yi Huang, Reyin Lien et al (2002) Pregnancy in women who undergo long-term hemodialysis. *Am J Obstet Gynecol* **187**(1): 152–6

Chen PJ, Liu CM, Chang SD et al (1999) Elevated second trimester maternal serum hCG in patients undergoing haemodialysis. *Prenat Diagn* **19:** 955–8

Haase M, Morgera S, Bamberg C et al (2005) A systematic approach to managing pregnant dialysis patients – the importance of an intensified haemodiafiltraton protocol. *Nephrol Dial Transplant* **20**(11): 2537–42



# Making a monkey of the antivivisection movement

Adam Wisheart's thoughtful documentary, *Monkeys, rats and me: animal testing* (BBC2, 27 November, 2006), was about three-quarters of the way through when there was one of those delightful moments that points up the illogicality of the animal rights movement. SPEAK, and if you want to know what the acronym stands for you'll have to look it up, is a non-violent organization opposed to the building of an animal laboratory in Oxford. Every day, its members stand on the pavement across the street and shout abuse at the workmen, most of whom wear masks to shield their identities. Most of the slogans are predictable and unpleasant, but a couple of protesters started suggesting that the workers should go out and get proper jobs. Then one of them yelled, 'Why don't you go and get a job in McDonald's?'

It seems to me that the protesters would help animals more by picketing McDonald's than by picketing the Oxford science laboratories.

Thoughtful though it was, the programme was disappointing. It centred mostly on four individuals. Mel Broughton is the leader of SPEAK. He came over as misguided zealot, prone to violence. Tipu Aziz is a neurosurgeon, who defends his research on monkeys as an important way to find new treatments for unpleasant movement disorders. There was something rather odd, rather Spock-like, about him – although I don't think Spock smoked.

Laurie Pycroft is a sixth former who helped set up Pro-Test, an organization that campaigns in favour of animal experiments for scientific research. He probably would agree he's a bit of a nerd, but you can't deny his courage. The fourth lead player was a 12-year-old boy confined by dystonia to a wheelchair and grunts. At the end of the programme, and following an operation by Aziz based on his monkey research, the boy had taken a few steps and was speaking more clearly. What would Broughton or, even better, some of the earnest slogan shouters on Oxford's pavements say to him?

Wisheart didn't really explore any of the reasoning behind the protesters' views. I suspect that is because there isn't any; they work from the simple axiom that all animal experimentation is wrong. Start from there, and there is no need to think. Indeed, all statements can be adjusted to fit. Thus, although almost all treatments used today depended on animal research, this is flatly denied. Broughton is apparently on record saying there is now a computer simulation of the whole human body that negates the need for animals. There isn't, but most people on those pavements probably think there is.

Towards the end of programme, the philosopher Peter Singer, responsible for much of the proper thinking behind the animal rights movement, appeared in discussion with the scientists. Aziz said that probably 100 monkeys had been used, and upward of 10 000 patients had so far been helped. Singer saw nothing wrong with this, provided there really was no other way. Which there isn't. Mel Broughton was not in the audience.

Wisheart finished by admitting his disquiet at some of the animal experiments that he had witnessed, but found himself now believing that they were warranted. That, to me, seems the only sensible attitude. **BJHM**

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