Acute unilateral cataract in a postpartum adolescent with poorly-controlled type 1 diabetes

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Summary: Acute cataract is recognized as a rare complication in adolescents with type 1 diabetes mellitus and may be associated with rapid improvement in glycaemia in patients with newly diagnosed diabetes. Transient cataracts, which resolve following improved metabolic control, and irreversible cataracts requiring surgery have also previously been documented. Development or progression of retinopathy may complicate pregnancy in women with diabetes. To our knowledge, we present the first case report of an acute cataract developing postpartum in a woman with type 1 diabetes.

This rare case serves to demonstrate a possible association between acute cataract and altered glycaemic control in pregnancy. Acute cataract should be considered in any woman with diabetes who develops sudden visual loss following pregnancy.

Keywords: type 1 diabetes, pregnancy, glycaemic control, cataract, adolescence

BACKGROUND

Acute cataract is recognized as a rare complication in adolescents with type 1 diabetes mellitus¹ and it has previously been associated with rapid improvement in glycaemia in newly-diagnosed patients. Although diabetic retinopathy is known to deteriorate in pregnancy, to our knowledge there are no previous reports of acute cataract developing in the postpartum period.

CASE REPORT

We present the case of a female patient who was diagnosed with type 1 diabetes, aged 14, having presented with a two-month history of weight loss and lethargy. Her first pregnancy, at the age of 15, was unplanned and glycosylated haemoglobin (HbA1c) in early pregnancy was 12.2%. HbA1c fell to 6.3% by 34 weeks gestation and routine retinal photography in each trimester of pregnancy was normal. Her baby daughter was delivered at 37 weeks by emergency caesarean section due to spurious labour. In early childhood, the daughter was diagnosed with asymmetric crying face syndrome, presenting with right sided facial weakness, hearing loss and visual loss.

Following her first pregnancy, she was non-compliant with both hospital and general practitioner clinic attendance. She was re-referred to the antenatal clinic aged 18 years, with a second unplanned pregnancy. At six weeks gestation, HbA1c was 11.6%. She was aware of the adverse effects of poor glycaemic control upon the pregnancy and was fully compliant with

medical advice throughout pregnancy. HbA1c fell dramatically and was 6.9% at delivery. The mean blood glucose was calculated from seven pre- and postprandial readings per day, downloaded directly from the glucometer (Medisense Precision, Abbott Laboratories, Bedford, MA, USA). Four weekly mean blood glucose values were 8.2 mmol/L at the end of the second trimester and 6.1 mmol/L by the end of the third trimester. By the second trimester, 77% of glucose values were between 3.5 and 8.0 mmol/L, with 7% below 3.5 mmol/L and 16% above 8.0 mmol/L. Retinal images in each trimester were normal. At 36 weeks gestation, she presented in premature labour and delivered a healthy baby boy, weighing 3.5 kg. She was not hypertensive at any stage and did not receive steroids for fetal lung maturation.

Six weeks later she presented for postnatal review with a specialist nurse and gave a three-day history of acute right-sided visual impairment. Visual acuity was reduced to 6/24 in the right eye and 6/5 in the left. There was no other relevant past medical history or family history of eye disease. Photography of the fundi was arranged immediately and revealed a hazy image of the retina, suggesting an acute cataract (Figure 1). She was referred urgently to the ophthalmology department.

Three days later, visual acuity in the affected eye had deteriorated to 6/36. Acuity in the left eye remained 6/5. Slit-lamp biomicroscopy revealed severe right lens opacification in the right eye and an acute diffuse cortical cataract was diagnosed. B-scan ultrasound showed a flat retina with no evidence of a tractional retinal detachment. Upon review in the ophthalmology clinic, a few days later, visual acuity in the right eye had deteriorated further to counting fingers. Urgent cataract surgery was performed to minimize the risk of the lens becoming swollen, leading to a rise in intraocular pressure. The operation was successful and two months postoperatively, vision was restored to 6/6

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Figure 1 (a) Normal right eye retinal image at 35 weeks gestation; (b) Left eye at 35 weeks gestation; (c) Right eye eight weeks later showing severe lens opacification; (d) Left eye eight weeks later remains normal

in the right eye. Notably, HbA1c at this time was 13.4%, confirming that glycaemic control had deteriorated drastically after pregnancy.

CONCLUSION

To our knowledge, this is the first case report of visual loss secondary to an acute cataract following pregnancy in a patient with type 1 diabetes. Although cataracts are more common in people with diabetes, they are a rare complication in adolescent patients and usually associated with prolonged poor glycaemic control.² Acute diabetic cataracts have been reported in children and young adults with newly diagnosed type 1 diabetes mellitus and usually present within weeks or months of starting insulin therapy.³ Patients in such cases are documented to have high HbA1c levels and a prolonged duration of symptoms prior to diagnosis of diabetes mellitus. We suggest that, in our patient, cataract formation may have been related to a rapid deterioration in glycaemic control following pregnancy, since acute cataract has been documented as a presenting feature of diabetes.⁴ This rare clinical finding may be irreversible. However, transient cataracts in children with diabetes, which disappear with improved metabolic control, have also been reported.⁵

The exact mechanism of diabetic cataract remains unclear. Osmotic stress secondary to sorbitol accumulation is believed to be an important factor. The enzyme aldose reductase, which is predominantly present in the lens epithelium, reduces glucose to sorbitol via the polyol pathway. Glucose

uptake in the lens is independent of insulin, thus, hyperglycaemia may lead to excessive intracellular sorbitol levels. This causes an increased osmotic stress within the lens, causing swelling, fibre breakdown and opacification. Sorbitol can also produce oxidative stress by depleting cofactor nicotinamide adenine dinucleotide phosphate, which is required for regeneration of reduced glutathione.⁶ Oxidative stress may also be related to hyperglycaemia and non-enzymatic glycation.⁷ Genetic mechanisms have also been considered.⁸

Diabetic retinopathy is known to deteriorate in pregnancy.¹ This is often following a rapid change in glycaemic control and risk factors include long duration of diabetes, poor glycaemic control before pregnancy and an increase in growth factors (e.g. vascular endothelial growth factor) during pregnancy.⁹ In a recent prospective study, progression of retinopathy was documented in 5% of pregnancies.¹⁰ It is therefore recommended that women with diabetes, without previous retinopathy, should have routine retinal screening in each trimester. Women with known retinopathy before, or documented in early pregnancy should be referred for ophthalmic review during pregnancy.

Acute cataracts are a rare condition and the speed at which this patient's vision deteriorated after diagnosis is particularly remarkable. The majority of case reports describe bilateral cataract formation. There is no clear explanation for the unilateral visual loss in this patient. However, this case serves to demonstrate that cataracts should be considered in women presenting with visual loss or blurring in one or both eyes, following pregnancy. Prompt surgical intervention should be offered if

vision continues to deteriorate, although it should be noted that transient cataracts may occur in some cases. Furthermore, patients should be advised to maintain stable and adequate glycaemic control prior to, during and after pregnancy, which may help to avoid this rare but serious complication of diabetes.

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