

IMSANZ Annual Scientific Meeting, Alice Springs, Sep 2005

Diabetes in Pregnancy – as in Alice Springs Hospital 2004

Presentation slides and notes

- Alice Springs hospital provides an obstetric regional service for the area extending north to Elliott, south and west to the Pitjantjatjara and Ngaanyatjarra lands in SA and WA, and east to the Queensland border
- In 2004 there were 768 births in the region
- About 60% of the women confined were Aboriginal

Background

- In 2004 the antenatal diabetic clinic was restructured
- The clinic is held once a week and is staffed by an obstetric consultant and registrar, diabetic educator, and midwife
- For women living in remote areas care is shared between the local clinic and the hospital
- For Aboriginal women living in Alice Springs who are attending Alukura, consultation with the hospital clinic is encouraged

This restructure was due to the retirement of a community physician who had previously run a diabetic antenatal clinic and provided advice regarding management. Her position has not been replaced, and we do not currently have dedicated physician input to the clinic.

Aims

- The aim of the study was to ascertain the obstetric and perinatal outcomes for those women with diabetes mellitus, gestational or pregestational, who were confined during the year 2004 in the Alice Springs region

To do this a chart review was performed

Number of women with diabetes in Alice Springs region delivered in 2004

		ABORIGINAL no.(%)	NON ABORIGINAL no.(%)	TOTAL no.(%)
PREGESTATIONAL DIABETES MELLITUS	TYPE 1	0	1	1
	TYPE 2	20	0	20
GESTATIONAL DIABETES MELLITUS		47	11	58 (73)
TOTAL no.(%)		67 (85)	12 (15)	79

79 women were identified as diabetic during pregnancy and delivered at either ash or tch. There were a further 3 women with diabetes in pregnancy who were not included in the study population because they were transferred to and delivered in Adelaide.

These women represent just over 10% of our obstetric population.

67 out of the 79 women, or 85%, were aboriginal.

58 women ,73%, had gestational diabetes, and 21, 27%, were known to be diabetic prior to the pregnancy. Only one woman had type 1 dm.

43 women, 54%, lived in a rural or remote community, with the remaining women living in Alice Springs or Tennant Creek.

Maternal characteristics I

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=21	TOTAL no. (%)
PRIMIPAROUS-no.	10	2	12 (15)
MULTIPAROUS-no.	48	19	67 (85)

15% of the women are primiparous.

Maternal characteristics II

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=21
MEAN AGE- yrs (range)	27.8 (17-42)	28.6 (17-40)
WEIGHT > 80 kg (< 20 weeks gestation)- no. (%)	16 (28)	9 (43)

The women with pregestational diabetes were on average slightly older, with the range of ages in each group being similar.

About a third of the group overall were more than 80 kg during the first half of the pregnancy.

Antenatal characteristics

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=21
BOOKING GESTATIONAL AGE < 14 WEEKS- no.(%)	34 (60)	16 (76)
ANY ULTRASOUND < 22 WEEKS- no.(%)	36 (62)	19 (90)
ANEMIA (Hb < 10 g/L)- no.(%)	4 (7)	5 (24)
ANY SEXUALLY TRANSMITTED INFECTION- no.(%)	11 (19)	4 (19)
HYPERTENSION IN PREGNANCY- no.(%)	4 (7)	2 (10)

While it was not always easy to truly ascertain the gestational age at booking from the hospital notes, we estimated that 60% of the gestational diabetic group and 76% of the pregestational group booked with their local clinic at less than 14 weeks gestation.

62% of the gestational group had an USS performed at less than 22 weeks and 90% of the pregestational group.

In both groups 19% were diagnosed during the pregnancy with any sexually transmitted infection. These infections included syphilis, trichomonas, gonorrhoea, and chlamydia. This compares to background rate of around 25% in Aboriginal communities in this region.

HbA1C results < 20 weeks

	GESTATIONAL DIABETES MELLITUS n=2	PREGESTATIONAL DIABETES MELLITUS n=17
< 6%no.(%)	2 (100)	2 (12)
6-8%no.(%)	0	5 (29)
>8%no.(%)	0	10 (59)

76% of the pregestational group had a hba1c performed in the first 20 weeks. Ten of these women had a level > 8%, with 5 of these women having a level > 10% (which is not shown).

HbA1C results >30 weeks

	GESTATIONAL DIABETES MELLITUS n=34	PREGESTATIONAL DIABETES MELLITUS n=12
< 6%no.(%)	24 (71)	2 (17)
6-8%no.(%)	10 (29)	8 (67)
> 8%no.(%)	0	2 (17)

After 30 weeks,12 women, or just over half of the pregestational group had a hba1c level done, with only 2 women still showing a level > 8%, 8 had a level of 6-8% and 2 had a level <6%..

As perhaps expected the gestational diabetes group had better levels, none being over 8% in the women who were tested.

Management I

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=21
INSULIN- no.(%)	22 (38)	16 (76)
METFORMIN- no. (%)	4 (7)	2 (10)
INSULIN +METFORMIN- no.(%)	0	1 (5)
NIL MEDICATION-no. (%)	32 (55)	2 (10)

Insulin was used in the majority, 76%, of pregestational diabetic women, and 38%, of the gestational group.

Metformin was used in 7 women overall. It was usually used when there were concerns regarding compliance with insulin, or when a woman absolutely refused to use insulin.

Management II

	GESTATIONAL DIABETES MELLITUS n=22	PREGESTATIONAL DIABETES MELLITUS n=17
ONCE DAILY INSULIN- no.(%)	10 (45)	1 (6)
TWICE DAILY INSULIN- no.(%)	12 (55)	13 (76)
INSULIN FOUR TIMES A DAY- no.(%)	0	3 (14)

A variety of insulin regimens were used, but the majority used it as a twice daily dose. Only 3 women used insulin 4 times daily.

BSL monitoring

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=21
REGULAR HOME BSL- no.(%)	26 (45)	7 (33)
ANY ATTEMPT AT HOME BSL-no.(%)	16 (28)	9 (43)
NO ATTEMPT HOME BSL- no.(%)	16 (28)	5 (24)

While acknowledging that retrospective assessment of bsl monitoring and control is difficult to do from hospital notes we did attempt to do so. Since early 2004 photocopies of the woman's home record are made when she attends the clinic.

About ¼ of each group had no evidence of any attempt at home bsl monitoring in the hospital notes.

Less than half overall had any evidence for regular monitoring. While this may be an underestimate it is not a figure that we were surprised to find.

BSL control

- If at least 2 weeks worth of records were available in the chart then a subjective assessment was made of her bsl control
- The following guidelines were used to categorise the women into 3 groups

If at least 2 weeks worth of records were available in the chart then a subjective assessment was made of her control.

- Good control was defined as achieving a fasting bsl < 5.5 mmol/L and 2 hour postprandial levels < 7.5 mmol/L at least 90% of the time.
- For the remainder of the group with adequate records, they were then categorised into 2 mutually exclusive groups- the first group being those women in whom bsl were < 10 mmol/L more than 50% of the time, and the second group being those women in whom bsl were > 10 mmol/L more than 50% of the time.

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BSL control

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=21
GOOD BSL CONTROL- no.(%)	19 (33)	2 (10)
BSL< 10 mmol/L at least 50% of the time- no.(%)	10 (17)	7 (33)
BSL> 10 mmol/L at least 50% of the time- no.(%)	0	2 (10)
UNABLE TO COMMENT-no.(%)	29 (50)	10 (48)

For about half the women in each group there was inadequate documentation to allow an assessment of her bsl control.

Good control was seen in 1/3 of the gestational group, and 1/3 of the pregestational group were in the the intermediate category.

Delivery outcomes

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=21
NORMAL VAGINAL DELIVERY-no.(%)	27 (47)	8 (38)
ASSISTED VAGINAL DELIVERY-no.(%)	3 (5)	1 (5)
ELECTIVE CAESAREAN DELIVERY-no.(%)	8 (14)	4 (19)
EMERGENCY CAESAREAN DELIVERY-no.(%)	20 (34)	8 (38)
TOTAL CAESAREAN DELIVERY-no.(%)	28 (48)	12 (57)

52% of the gestational group, and 43% of the pregestational group achieved a vaginal delivery.

The background caesarean rate for the entire obstetric population in 2004 was 24%, with an emergency caesarean rate of 14.6%.

In both diabetic groups the caesarean section rate is about double this background rate.

Neonatal outcomes I

	GESTATIONAL DIABETES MELLITUS n=59	PREGESTATIONAL DIABETES MELLITUS n=22
BIRTH WEIGHT ≥ 4 kg- no.(%)	18 (31)	7 (32)
BIRTH WEIGHT ≥ 4.5 kg- no.(%)	4 (7)	2 (9)

Similar proportions of babies in each group weighed both larger than 4 kg at birth, 31% in the gestational group and 32% in the pregestational group.

Less than 10% in each group weighed more than 4.5 kg.

Neonatal outcomes II

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=20
ADMISSION TO SPECIAL CARE NURSERY-no.(%)	20 (34)	14 (70)
MEAN DURATION OF STAY- days (range)	7.5 (1-25)	11.1 (1-56)

The majority of infants in the pregestational group, 70%, were admitted to the scn, compared to 34% of the gestational group.

The pregestational group also tended to stay longer in the nursery compared to the gestational group.

Neonatal outcomes III

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=20
HYPOGLYCEMIA (<2.5 mmol/L)-no.(%)	23 (40)	12 (60)
HYPOGLYCEMIA REQUIRING INTRAVENOUS DEXTROSE-no.(%)	10 (17)	11 (55)

60% of the infants in the pregestational group had at least one bsl < 2.5 mmol/L, and 11 of these 12 infants required intravenous treatment for hypoglycemia.

Neonatal outcomes IV

	GESTATIONAL DIABETES MELLITUS n=58	PREGESTATIONAL DIABETES MELLITUS n=20
OXYGEN REQUIREMENT AT 1 HR OF AGE-no.(%)	11 (19)	8 (40)
ANTIBIOTIC TREATMENT- no.(%)	11 (19)	8 (40)
TREATED JAUNDICE- no.(%)	5 (9)	4 (20)

A greater proportion of the pregestational group required oxygen at 1 hour of age, antibiotic treatment for suspected or confirmed sepsis, and jaundice, when compared to the gestational group.

More neonatal results

- There were 2 cases of shoulder dystocia- one in each group
- There were 3 stillbirths- 2 in the pregestational diabetes group and 1 in the gestational diabetes group
- There was one baby with major congenital malformation (holoprosencephaly, VSD) in the pregestational group

The baby in the gestational diabetic group weighed 3720 g, and the baby in the pregestational group weighed 4240 g.

The SB in the gestational diabetic group was due to extreme prematurity, it occurred in a woman who ruptured her membranes at 21 weeks. The other 2 stillbirths occurred in the 3rd trimester, one of the babies weighing 3340 and the other 3020 g.

During 2004 there were 8 stillbirths for the total obstetric population; giving a background perinatal mortality rate of around 10/1000. The perinatal mortality rate for the combined diabetic groups was 37/1000 for the same year.

Conclusions

- Women with diabetes in pregnancy, and their babies, suffer substantial morbidity and mortality
- It is the women and babies of the pregestational diabetes group who bear a disproportionately higher burden of this morbidity and mortality.

Our conclusions are limited by the small numbers in the study, however, the data do support our view that women with diabetes in pregnancy and their babies suffer substantial morbidity and mortality, and it is the women of the pregestational group who bear a disproportionately higher burden of this morbidity and mortality.

Discussion

- For women with preexisting diabetes, encouragement of earlier referral to the clinic, and improved outpatient care
- Identification of barriers and difficulties women have with home monitoring and administration of insulin
- Defining the role of metformin in our population

I would like to briefly mention 3 areas which I think we need to address.

While we can see that the majority of women with preexisting diabetes are booking at less than 14 weeks, and managing to have an USS at less than 22 weeks we know from the HbA1c levels that their early BSL control is poor. Our impression is that there is a lag between booking and attending for specialist care. We know that there is need for improved communication between the community clinics and we need to encourage earlier attendance at the hospital antenatal clinic. This can be difficult due to the large distances involved and very often resistance from the women themselves. In addition, if a woman from a remote community is thought to require insulin then it usually involves hospital admission. We know this is just not acceptable to many women, and their reluctance to be admitted simply delays effective treatment. For these reasons we need to try to promote and support the outpatient management of diabetic women in their communities.

There is currently a suggested management protocol for diabetes in pregnancy which is used within the hospital. Promotion of its use in the communities may help community clinics manage these women on a day to day basis.

Our results support the view that one of our greatest challenges is simply getting women to monitor their BSL levels.

There may be many reasons why it may be difficult for a woman to monitor her BSL and administer insulin.

Cultural attitudes to health, education and understanding of the condition, and logistical issues such as poor housing and the fact that she may not even possess a refrigerator, will all influence her ability to do so.

We need to know more about how much women understand diabetes and how they view its management.

Finally, while metformin is used in a handful of women, up until now this has usually been done because of more than average concern regarding an individual's compliance with insulin. We need to explore whether it may be more generally acceptable in our population, and whether it has an effective role in management, either as a single agent or as an adjunct to insulin.