
A Review of Maternal Complications of Multiple Pregnancy

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Professor Ian MacGillivray in 1983 in his presidential address to the 4th International Congress on Twin Studies in London coined the term “Supermums” to describe the mothers of twins (MacGillivray, 1984). He amplified this term by suggesting not only that taller, heavier and more fertile women were more likely to have a twin pregnancy, but also that women expecting twins had an exaggerated physiological response to pregnancy and should therefore be considered as excellent reproducers. His suggestion only partly supported what James Matthews Duncan had written in 1865 (Matthews, 1865) when he described similar characteristics of women who were likely to have twin pregnancies, stating at the same time an observation that would stand the test of the next 140 years: “The rarity of plural births in women and increased danger to mother and offspring in these circumstances renders such an event in a certain limited sense a disease of abnormality”.

Duncan’s admonition concerning risk is now well recognized and quantified at least for the baby. In contrast, the risk to the mother is usually stated as an expected general increase in maternal morbidity and occasionally mortality as a result of pregnancy complications. This review will consider both major and minor maternal problems in pregnancy in the context of the exaggerated maternal adaptation to multiple pregnancy.

Physiological Changes and Adaptations

The maternal physiological adaptation to singleton pregnancy is considerable, and an even greater response is necessary in twin pregnancy to ensure good-sized healthy babies. The trigger to maternal physiological response is hormonal with an increased production in both steroid (MacGillivray et al., 1971; Masson, 1973) and protein hormones (Grennert et al., 1976; Jandial et al., 1979) from the fetal placental unit during twin pregnancy.

Weight gain in twin pregnancy is greater than in singleton pregnancy with the average total weight gain in twin pregnancies being 3.5 kg more than in singleton pregnancies. The pattern of rate gain is also different with the maximum weight gain in multiple pregnancies in the early part of gestation before 20 weeks and in late gestation, whereas the maximum rate of weight gain in singleton pregnancy is in mid-pregnancy (Campbell, 1974). That there is increased weight of products of conception in twin pregnancies is obvious but it is also likely that all compo-

nents of weight gain are increased in twin pregnancy. For example there is an increase in water retention (Campbell, 1988a) and an increase in fat storage to be utilised as an energy source during late pregnancy for fetal growth and even later for lactation (MacGillivray et al., 1971).

Dietary intake in twin pregnancy is similar to that of singleton pregnancy although total fetal weight is greater (Campbell, 1988b). The adaptation of the mother to multiple pregnancy is thus sufficient to enhance absorption of nutrients from the diet to optimum levels for fetal growth of the twins. Nutrient handling and metabolism is influenced by the mother’s hormone changes. While broadly similar to those of singleton pregnancies these are enhanced to favour optimal placental transfer of nutrients to the developing fetuses with adequate supply of essential factors and energy. For example, there is a slower rate of glucose dispersal after a glucose load in twin pregnancies compared to singletons (Campbell & MacGillivray, 1979).

Cardiac output, markedly increased in singleton pregnancies was originally thought to be slightly increased in women expecting a twin pregnancy (Ravinsky & Jaffin, 1966), however, more recent work with modern techniques (Campbell et al., 1985) found no difference in stroke volume or cardiac output using a non-invasive technique. Total peripheral resistance is lowered in a twin pregnancy on account of greater production of progesterone and subsequent local blood vessel release of prostaglandins, for example prostacyclin, with a lowering of diastolic blood pressure. A lower diastolic blood pressure was noted in women expecting twins than in singleton pregnancies (Campbell & Campbell, 1985).

Blood volume expansion is well documented in multiple pregnancies with a greater relative increase in plasma volume than in red cell volume, resulting in physiological anaemia with lower haemoglobin concentrations and lower haematocrit values in multiple pregnancies (Campbell, 1988c).

Alteration in other body systems has also been reported, such as changes in renal, respiratory and liver function (Campbell, 1988d; MacGregor & Silver, 1995). While this exaggerated maternal response to pregnancy is important for fetal growth of twins, it is also of relevance in the clinical management of the women expecting twins.

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Physiological changes can raise suspicion and aid in diagnosis of multiple pregnancy. Different standards of normality have to be set for multiple pregnancies compared with singleton pregnancies, both in the diagnosis of complications, for example anaemia, and in their management, for example preeclampsia when altered renal and liver function is important in monitoring the condition.

Minor Complications

In the second half of twin pregnancy many might consider the minor complications of pregnancy increased. As a result of the enlarged uterus and increased hormone output, backache and lower abdominal pain become more frequent. As intra-abdominal pressure rises the frequency of micturition, constipation, varicose veins and oedema are all noticed. Sometimes, in late pregnancy it becomes difficult for the woman expecting twins to be comfortable in any position at rest, and walking is also difficult partly due to locomotor difficulties and partly to breathlessness, as the diaphragm is pushed upwards and splinted. Heartburn can also be a major problem particularly at night, disturbing sleep patterns even further. Although these problems may not be of major concern to obstetric staff, they can be a considerable burden on the woman expecting twins. The obstetrician should adopt a sympathetic approach, reassuring women that these are very common in multiple pregnancy and that they are based in the exaggerated response to multiple pregnancy and will not be a problem following delivery.

Major Complications

Antenatal complications of pregnancy, which pose a life threatening risk to the mother to be considered, are hypertensive disorders of pregnancy, antepartum haemorrhage and anaemia. Preterm labour, a very common occurrence in multiple pregnancy, does not usually pose a threat to the mother unless infection intervenes or it arises as a side effect of management with the use of tocolytic agents combined with steroids carrying an increased risk of pulmonary oedema. Other problems in labour namely operative delivery and postpartum haemorrhage will be reviewed.

Hypertensive Disorders — Preeclampsia

The incidence of gestational hypertension, preeclampsia and eclampsia has recently been confirmed again to be greater in twin pregnancies when compared to singleton pregnancies, both in primiparae and multiparae (Campbell & MacGillivray, 1999; Coonrod et al., 1995). This was not influenced by the sex of the offspring or zygosity but preeclampsia was more commonly associated with monochorionic placentation. Because of the increased frequency of severe disease and its association with growth retardation, this is a very serious condition for both mother and babies. Special vigilance over a mother expecting twins is needed with more frequent blood pressure checking and urine testing, especially after 30 weeks when weekly checks are indicated. Any single sign of developing preeclampsia, for example, proteinuria alone or a mild rise in blood pressure, should be considered as a reason for hospital

admission as the progression of the disease may be very rapid in multiple pregnancy. Additionally proteinuria may present at lower diastolic blood pressures than in singleton pregnancy (Campbell, 1995) and women with proteinuria only in a multiple pregnancy should be treated as having preeclampsia unless it is proven otherwise. Management following admission to hospital is along the lines of management in singleton pregnancy with frequent monitoring of both maternal and fetal well being to enable optimal timing of delivery. The recent study from Aberdeen (Campbell & MacGillivray, 1999) indicates that for the twins fetal outcome, with respect to growth and mortality, was not significantly poorer in preeclamptic women than normotensive women when gestation at delivery was taken into consideration.

Antepartum Haemorrhage

Antepartum haemorrhage is believed to occur more frequently in twin than in singleton pregnancies on account of the greater incidence of preeclampsia with the possibility of placental abruption and the larger area of placental tissue with the likelihood of placental separation. However, the expected increase in incidence of antepartum haemorrhage is not confirmed in all studies (MacGillivray & Campbell, 1988; Patel et al., 1984). A modest increase in antepartum haemorrhage of unknown origin, possibly secondary to better reporting in twin than in singleton pregnancy, has also been shown. No difference in the rates of any type of antepartum haemorrhage by zygosity or placentation has been noted (MacGillivray & Campbell, 1988). Placental abruption and placental praevia should be managed in twin pregnancy in a similar fashion to singleton pregnancy.

Vaginal bleeding in early pregnancy, that is, threatened miscarriage, is not usually life threatening but is nevertheless more common in women who delivered twins than in singletons (MacGillivray & Campbell, 1988; Patel et al., 1984).

Anaemia

Bearing in mind the physiological changes in plasma volume and red cell volume the definition of anaemia in a multiple pregnancy requires consideration. Haemoglobin concentration and packed cell volume are unreliable indicators of anaemia. Perhaps more reliance should be placed on mean corpuscular haemoglobin concentration which does not change. The 1983 Scottish Twins Study (Patel et al., 1984) found no difference in the incidence of anaemia in twin and singleton pregnancies when anaemia was defined as haemoglobin concentration less than 9.5 g/dl. Studying 123 twin pregnancies in Grampian over a defined time period (Hall et al., 1979), it was concluded that the incidence of clinically significant anaemia was low after extensive studies including repeat peripheral blood examination and sternal marrow examination. Although both iron and folic acid stores may be reduced transiently during twin pregnancy, the authors concluded at the time of their writing that prophylactic iron and folic acid should not be recommended for the prevention of anaemia in multiple pregnancy but specific treatment should be given when there was evidence of significant anaemia. However, there is still debate among obstetricians

about the need for supplementation. Women in developing countries who often have inadequate or absent iron stores may be susceptible to iron deficiency during a multiple pregnancy and supplementation of such women is required when severe anaemia can be a risk to life.

Operative Delivery

Caesarean section rates have been rising steadily over the years in both singleton and multiple pregnancies with rates of well over 50% reported in twins (Cetrulo, 1986). A rise in both elective and emergency caesarean sections in multiple pregnancy has been reported (Campbell & MacGillivray, 1988a). Very high rates of such operative deliveries may well lead to increased maternal mortality and morbidity post delivery, but little has been reported with respect to postnatal complications such as venous thrombosis and embolism.

Postpartum Haemorrhage

Because of the increased placental size, uterine over-distension and a greater tendency to uterine atony, it is generally agreed that postpartum haemorrhage is a significant problem for the mother in a multiple pregnancy. Many years ago active management of the third stage with controlled cord traction and use of oxytocic agents was claimed to minimise this risk in twin delivery (Wood & Pinkerton, 1966). Recent reviews of intrapartum management in multiple pregnancy do not comment on the incidence of primary postpartum haemorrhage. Manual removal of the placenta and secondary postpartum haemorrhage were both noted in the Aberdeen series to be more common following twin deliveries (Campbell & MacGillivray, 1988b).

Conclusion

Major complications can be life threatening for women with a multiple pregnancy. Even the minor disorders of pregnancy are exaggerated, although many women expecting twins experience little difficulty. Antenatal care should be tailored to individual needs. Routine hospital admission offers little advantage (Campbell, 1990). However, it is essential that women with twin pregnancies should be admitted to a major centre for surveillance as soon as any specific indication is present, such as the development of preeclampsia, antepartum haemorrhage, or threatened preterm labour. Delivery should take place in a major unit able to cope with maternal and neonatal requirements. Monitoring in hospital should take into account the exaggerated physiological adaptation to multiple pregnancy.

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