

INCREASED PERINATAL MORTALITY FOLLOWING RESTRICTION OF PLACENTAL AND FETAL GROWTH

J. A. Owens, M. J. De Blasio, S. Fielke, J. S. Robinson, K. L. Gatford

Department of Obstetrics & Gynaecology, University of Adelaide, Adelaide, SA, Australia

Intrauterine growth restriction and subsequent low birth weight in humans are associated with increased perinatal mortality and morbidity. Impaired placental function is a major cause of IUGR in humans, but its impact on perinatal survival has not been clearly defined. We have therefore investigated the effect of restriction of placental and fetal growth on perinatal survival and behaviour in the neonatal lamb. Placental growth was surgically restricted (PR) by removal of the majority of endometrial implantation sites prior to pregnancy, leaving either 6 to 7 (moderate PR) or 3 to 4 (severe PR) visible caruncles in each uterine horn, and ewes were mated following at least 10 weeks recovery. Perinatal outcomes (stillbirths and neonatal death before 3 days of age) were recorded in a cohort of 48 control (30 singleton, 18 twin) and 28 moderate PR (14 singleton, 14 twin), and 21 severe PR (11 singleton, 10 twin) lambs, and effects of PR or twinning were evaluated by Chi-square analysis. Rates of stillbirth ($P = 0.006$) and total perinatal deaths ($P < 0.001$) were higher in severe PR pregnancies than in control or moderate PR lambs, overall (see Table).

| | | Control | Moderate PR | Severe PR |
|------------|----------------|---------|-------------|-----------|
| Singletons | Stillborn | 1/30 | 0/14 | 2/11 |
| | Neonatal death | 2/30 | 1/14 | 1/11 |
| Twins | Stillborn | 4/18 | 1/14 | 7/10 |
| | Neonatal death | 3/18 | 2/14 | 1/10 |

Similarly, severe PR increased stillbirths and perinatal deaths in twins alone ($P = 0.003$ and $P = 0.015$ respectively), but the effects of PR were not significant in singletons ($P = 0.10$, $P = 0.26$ respectively). Twinning increased stillbirths and perinatal deaths overall ($P = 0.002$, $P = 0.001$) and in control lambs alone ($P = 0.038$, $P = 0.017$). Restricted fetal growth due to twinning or severe surgical restriction of placental growth thus decreases perinatal survival, due to increased stillbirths. We will further investigate the characteristics of neonatal morbidity following PR by recording neonatal behaviour, including time taken to stand and suckle, in a subsequent cohort of control and PR lambs.