Embryonic survival and development at various stages of gestation after bilateral egg transfer in the cow

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In sheep, embryonic loss is higher after multiple ovulation than single ovulation (Casida, Woody & Pope, 1966; Edey, 1966; Mackenzie & Edey, 1975). Among twin-ovulating sheep, mortality is greater if both ovulations occur from the same ovary (Baier & Russe, 1968; Scanlon, 1972). Few data are available on the incidence of multiple ovulation in cattle and the extent of prenatal loss in multiple pregnancies is unknown. The development of egg transfer techniques in cattle (Rowson, Moor & Lawson, 1969) has permitted the establishment of twin pregnancies (Rowson, Lawson & Moor, 1971; Sreenan, Beehan & Mulvehill, 1975), and the embryonic survival and development in heifers becoming pregnant after bilateral surgical transfers were therefore examined.

Superovulation, egg recovery and transfer were carried out as previously described (Sreenan *et al.*, 1975). All recipient heifers were checked for return to oestrus with the aid of vasectomized bulls. Initial pregnancy diagnosis was based on heifers not returning to oestrus before transfer. All the heifers were selected on this basis and no attempt was made to diagnose the number of embryos or fetuses present before slaughter or calving. Animals were randomly assigned to the slaughter groups but the facilities available placed a constraint on the number it was possible to slaughter at particular times and groups of unequal size resulted. To determine embryonic survival rate, 39 recipients were slaughtered at 27–30, 31–40, 41–50 or 51–117 days of gestation and 13 were allowed to calve. After slaughter, the reproductive tracts were returned to the laboratory immediately and were examined for the presence of embryos. Embryonic weight was selected as being one of the best indicators of development (Prepin, Vigier & Jost, 1972) and was measured after ligation and section of the umbilical cord as near the abdomen as possible to avoid blood loss. Embryos from which blood was lost were excluded from the results. Analysis related to sex differences was not attempted.

The results in Table 1 show that there was no difference in survival rate of embryos at any of the stages examined. Degenerate embryos were found mainly at the early stages and indicated embryonic mortality before Day 27. Single embryos were slightly heavier at each stage of gestation as reported by Winters, Green & Comstock (1942), Maneely (1952), and Prepin *et al.* (1972), although this difference was not marked until calving.

Table 1. Embryonic survival and development in pregnant heifers after bilateral egg transfers

Stages of gestation (days)	No. of embryos		No. of degenerate embryos	Embryo weight (g)					
	Transferred	Surviving (%)		Single			Twins		
				No.	Mean	Range	No.	Mean	Range
27-30	22	19 (86)	2	3	0.19	0.16-0.33	8	0.15	0.09-0.29
31-40	36	30 (83)	4	4	1.19	0.30-2.35	24	0.17	0.17-2.49
41-50	12	10 (83)	—	3	2.22	2.04-2.47	8	2.10	1.36-3.56
51-117	8	6 (75)	1	1	760.00		—		
Calved	26	21 (81)	—	5	33,360	20,450-38,630	16	28,160	19,090-33,180
Total	104	86 (83)							

The high embryo survival rate after bilateral transfers is in agreement with the data of Rowson *et al.* (1971) who found a rate of 82% in heifers on Day 90. The greatest loss occurs in fertilized eggs soon after transfer and, once pregnancy is established, uterine capacity does not limit the ability of the cow to carry twins provided they are located in separate uterine horns. Rowson *et al.* (1971) have shown that embryonic loss is likely if two fertilized eggs are transferred to one uterine horn because transuterine migration is rare in cattle.

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