PRESSURE CHANGES IN RABBIT CONCEPTUS 7 TO 10 DAYS POST COITUM.
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Blastocyst expansion, while typical to some degree of all mammalian
conceptuses is, because of its rapidity and magnitude, particularly conspicuous in
the rabbit. The present study established the magnitude of and temporal changes
in the pressure within in situ conceptuses during early pregnancy. On 7, 8, 9 or
10 days post coitum (dpc), mixed-breed female rabbits were anesthetized, and the
number, spacing and dimensions of implantation sites were recorded. Conceptus
pressure was measured by the servo-nulling method employing a calibrated glass
micro-pipette (Intaglietta et al., Microvas. Res. 2: 212, 1970). The mean number
of sites was 6/cornu, and spacing appeared normal. Implantation site volume
increased from 7 through 10 dpc: 0.16 ± 0.03; 0.57 ± 0.14; 1.66 ± 0.37 and 2.32 ±
0.73 cm³, respectively (day 7 vs 10 p < 0.01) and sites remained essentially
spherical. Conceptus pressure declined between 7 through 10 dpc: 5.87 ± 1.53;
5.29 ± 1.53; 3.77 ± 0.95 and 3.18 ± 0.76 mmHg, respectively (day 7 vs 10 p < 0.05).
Pressure fluctuated slightly: the frequency of change declined rapidly between
7 and 8 dpc (3.17 ± 1.25 to 1.59 ± 0.50 peaks/min; p < 0.01) to reach 1.08 ± 0.30
peaks/min at 10 dpc. The amplitude of fluctuation also decreased from 7 to 10 dpc
(2.64 ± 0.75; 1.97 ± 0.63; 1.29 ± 0.94 and 0.91 ± 0.41 mmHg, respectively (day 7 vs
10 p < 0.01). The fluctuations in pressure were correlated with myometrial
contractions. Pressure inside conceptuses is a result of fluid accumulation
within and uterine compression from without. The decline in conceptus pressure
suggests that the uterine wall becomes progressively more compliant as blastocyst
cavity/yolk sac fluid accumulates within the conceptus. Compliance increases
primarily in the antimesometrial wall. Conceptus expansion resulting from
internal pressure may enhance conceptus-uterine metabolic exchange by increasing
the ratio of conceptus surface to cytoplasmic mass and by facilitating apposition
of conceptus-uterine surfaces. (Alexander-von-Humboldt-Stiftung
Forschungsstipendiat.)