

Title: ADVERSE REPRODUCTIVE OUTCOMES FOLLOWING ANESTHESIA AND OPERATION DURING PREGNANCY: A SWEDISH REGISTRY STUDY, 1973-1981

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INTRODUCTION: Little is known about the risk of adverse reproductive outcomes in pregnancy complicated by operation (and anesthesia) unrelated to delivery. To fill this void, we linked data from three Swedish health care registries for the nine year period, 1973-1981.

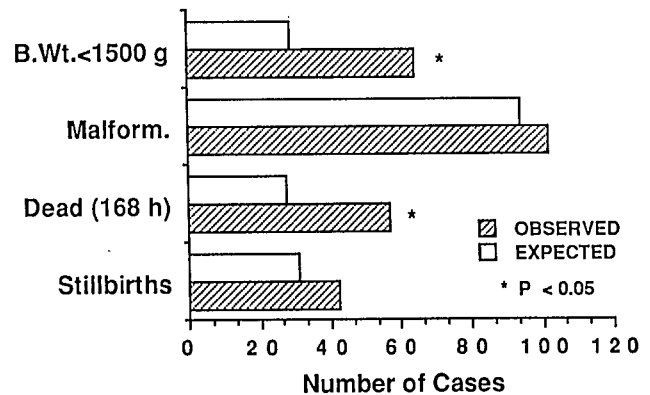
METHODS: Data from the Medical Birth Registry (MBR), the Registry of Congenital Malformations and the Registry for Somatic Care were linked using personal ID numbers. The MBR records all births in Sweden and contains maternal information, such as, parity, date of the last menstrual period (LMP) and date of delivery; and infant data, such as, birth weight, whether live-born or stillborn, whether alive at seven days, and whether anomalies were apparent at birth. The Registry of Congenital Malformations describes anomalies in more detail and has a higher diagnostic precision than the MBR. The Registry for Somatic Care details the date and type of operation and type of anesthesia and anesthetic drugs that were administered. Records were selected only if the date of operation fell between 14 days after the LMP and the day before delivery. Pregnancies which resulted in multiple births or in which operations were performed to prevent premature delivery were eliminated. Four adverse outcomes were examined: 1) congenital malformations; 2) still-born infants; 3) infants dead at 168 hours; and 4) infants with very low birth weight, i.e., < 1500 g. The type of operation and the type of anesthesia (general, with and without N₂O; topical; infiltration; spinal/epidural; major nerve block; or unknown) were noted. The total number of adverse outcomes, operations and anesthetics, and the number which occurred in each trimester of pregnancy were recorded.

Statistical Methods: The observed number of offspring with each adverse outcome born of operated women undergoing non-obstetrical operations was compared with the expected number from the non-operated group, using chi square analysis. Adjustments were made for maternal age and parity. 95% confidence limits were calculated to define relative risks. P less than 0.05 was considered statistically significant.

RESULTS: There were 880,299 pregnancies and 5,405 non-obstetrical operations during the nine year period (incidence, 0.61%). Operations in the 1st, 2nd and 3rd trimesters totaled 2,252 (41.6%), 1,881 (34.8%) and 1,272 (23.5%), respectively. Laparoscopy was the most common 1st trimester operation and appendectomy thereafter. The figure presents data for the total number of adverse birth outcomes in offspring of women operated on during pregnancy. The incidences of very low birth weight infants and infants dead at 168 h were significantly increased (P < 0.05), whereas those of congenital malformations and stillbirths were not. Results were the same when analyzed by trimester. Of note, the observed vs. the expected numbers of anomalies (44 vs. 42.6) during the 1st tri mester was not

increased. The table lists the types of anesthesia given to all operated patients and to those with adverse outcomes (listed only once). General anesthesia was given to 2,929 women; in more than 97% of the cases, N₂O was used with other inhaled and intravenous agents. No specific anesthesia (or operation) was associated with a significantly increased number of adverse outcomes. Unfortunately, anesthesia codes were missing from 32% of records.

DISCUSSION: This study demonstrates that the risk of malformations and stillbirths is not increased in pregnant women undergoing non-obstetrical operation. However, low birth weight and early neonatal death occurred with greater than expected frequency. These adverse effects cannot be attributed solely to operation and anesthesia. Rather, it is likely that the illness which necessitated the surgery played a significant role in determining the outcomes. It is difficult to compare our results with previously published reports as the populations examined in other studies were too small and/or their design was flawed.



Technique	All Cases		Adverse Outcomes		
	No.	(%)	No.	(%)	Obs/Exp
General	2929	54.2	59	41.9	0.77
Topical	97	1.8	3	2.1	1.17
Infiltration	278	5.1	9	6.4	1.25
Spinal/Epidural	255	4.7	8	5.7	1.21
Nerve Block	114	2.1	4	2.8	1.33
Unknown	1732	32.0	58	41.1	1.28
TOTAL	5405	99.9	141	100.0	