

INVERSION OF THE UTERUS AFTER CHILDBIRTH, WITH REPORT OF A CASE

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ALMOST every discussion of this subject begins with the statement that it is a very rare condition. Its incidence is variously estimated, as can be seen in the accompanying table, from Cohen's article, published in 1922.

TABLE FROM COHEN'S ARTICLE

Jardine	1 in	17,000 cases
Winckel	0	20,000
Braun	1	250,000
Denham	1	100,000
Beckman	0	250,000
Madden	1	190,000
Jones	1	127,000
Kehrer	1	2,000
Ahlfeld	1	100,000
Zangemeister	1	400,000
Welponer	1	35,000
Ferri and Lorini	1	1,440
Engelmann	1	5,000
Chetenham	1	6,300
Aveling	1	100,000
Total	13 in	1,603,740 cases
Average	1 in	123,364 cases

Zangemeister arrived at his conclusions as to the frequency of inversions of the uterus by comparing the cases that Thorn had collected from Germany with the total number of German births in the same years. It is likely that these figures underestimated the incidence of this condition as W. H. Fisher was able to collect 38 cases in and around Toledo, Ohio, in the last thirty-five years, only one of which had been reported in the literature. Kosmak, in 1914, stated that there had been 3 cases in the service of the New York Lying-In Society. Philips quotes De Lint to the effect that there were 24 puerperal inversions in 3,500,000 births in the Netherlands between 1896 and 1917.

The rarity of this accident is our justification for reporting the following case:

Mrs. H., age twenty-one years, white, American, married three years. Was delicate up to age of nine; in good health since. About three weeks after marriage had an attack of acute pyelitis, but no recurrence since. Was first seen on Sept. 5, 1923. Her last menstruation was on April 27, 1923, and she felt life on

TABLE I
CASES OF INVERSION OF THE UTERUS SINCE EVANS' ARTICLE, 1923.

AUTHOR	ATTEND- ANT	DELIVERY	AFTERBIRTH	TIME OF DIAGNOSIS	TREATMENT	RESULT
1. Acosta-Sison	m*	Spontaneous	Credé's method	At once	Reduced after separating placenta	Died
2. Acosta-Sison		Abortion		3 mo.	Reduced manually	Recov.
3. Albano	m	Spontaneous	Spontaneous	At once	Pressure on tubal angle	Recov.
4. Bégouin and Péry	p	Forceps	Pulled on cord	At once	Post. colpohysterectomy months later	Recov.
5. Botella	m	Spontaneous	Spontaneous	At once	Reduced manually	Died
6. Botella		Spontaneous	Spontaneous	At once	Reduced manually	
7. Botella				3 mo.	Küstner's operation	Recov.
8. Botella				2 mo.	Küstner's operation	
9. Bouffe de Saint Blaise	m	Spontaneous	Extracted by physician	Next day	Reduced manually	Died of sepsis
10. Cohen, H.	p	Forceps	Expressed easily	At once	Reduced after detaching membranes	Recov.
11. Cooper and Griffith	p	Forceps and Pitu- itritin	Postpartum hemo- rrhage	16 days	Reduced and packed with gauze	Recov.
12. Dantin	m	Spontaneous	Pulled on cord	At once	Reduced manually	Died
13. Daréne	h	Spontaneous	Pulled on cord	At once	Reduced after separating placenta	Recov.
14. Daréne	m	Spontaneous	Pulled on cord	At once	Reduced manually	Recov.
15. Daréne	m	Spontaneous	Hemorrhage	At once	Reduced manually	Recov.
16. Evans, J. J. W.	h	Forceps	Spontaneous	5 days	Reduced manually, recurred 6 weeks later, hys- terectomy	Recov.
17. Faugère	m	Spontaneous	Spontaneous	At once	Reduced manually	Died
18. Faust	p	Spontaneous	Spontaneous	At once	Reduced after separating placenta	Recov.
19. Faust	p	Spontaneous	Slight crede	3 days	Abdominal operation	Recov.
20. Ferguson	p	Low forceps	Expressed	5 weeks	Küstner's operation	Recov.
21. Finnegan	o	Precipitate	Spontaneous	At once	Reduced after separating placenta	Recov.
22. Fisher, W. H.	p	Spontaneous	Spontaneous	2 yr.	Hysterectomy	Recov.
23. Fox	p	Forceps	Oredé's method	Several hours	Reduced manually	Recov.
24. French	h	Low forceps	Expressed	5 weeks	Küstner's operation	Recov.

*m, Midwife; p, Physician; h, Delivered in hospital; o, No attendant.

TABLE I—CONT'D

AUTHOR	ATTEND- ANT	DELIVERY	AFTERBIRTH	TIME OF DIAGNOSIS	TREATMENT	RESULT
42. Levy	m	Spontaneous	Pulled on cord	At once	Unreduced	Died
43. Lolli	m	Spontaneous	Massage of uterus	At once	Gaillard Thomas' operation	Recov.
44. Mason and Rucker	h	Breech extraction	Moderate crede to stop bleeding	At once	Reduced manually	Recov.
45. Maclaure				At once	Hysterectomy after failing to reduce inversion	Recov.
46. Miginiac*	m	Spontaneous	Pulled on cord	At once	Ant. colpotomy, months later	Recov.
47. Neis	m	Spontaneous	Spontaneous	At once	Reduced manually	Recov.
48. Neis	m	Spontaneous	Spontaneous	At once	Reduced manually	Recov.
49. Phillips, Th. B.	h	Spontaneous	Spontaneous	At once	Reduced manually	Recov.
50. Phillips, M. H.	h	Forceps	Expressed after col-lapse of patient	4 mo.	Aveling repositior	Recov.
51. Potet and Maquet				3 mo.	Hysterectomy	Recov.
52. Pizzini	m	Spontaneous	Pulled on cord	At once	Reduced manually	Recov.
53. Pizzini	p	Spontaneous	Removed manually	At once	Reduced manually	Recov.
54. Ribeiro de Castro	m	Spontaneous	Pulled on cord	1 week	Surgical reduction	Recov.
55. Rinesi	m	Spontaneous	Pulled on cord	At once	Küstner's operation	Recov.
56. Roberts	h	Spontaneous	Spontaneous	At once	Reduced after separating placenta	Recov.
57. Roberts	p	Spontaneous		16 days	Reduced and packed	Recov.
58. Roegholt	m	Spontaneous	Pulled on cord	2 mo.	Haultaines operation, presacral anesthesia	Recov.
59. Rubel	p	Pituitrin and forceps	Crede	At once	Reduced after separating placenta	Recov.
60. Smythe	m	Twins, spontaneous	Hemorrhage after 2 weeks	3 mo.	Hysterectomy of inverted horn	Recov.
61. Teufk	m	Spontaneous	Pulled on cord	At once	Küstner's operation	Recov.
62. de Torrès					Küstner's operation	
63. Verrucoli	p	Spontaneous	Spontaneous, hemorrhage 7 hours later	8 hours	Reduced manually	Died

*Reported also by Cadenat.

in 41 instances, and after the first day in 20 instances (not stated in 2). It is interesting to note that in 4 of these late appearing inversions there was severe bleeding in the third stage of labor and in 5 others, shock severe enough to cause alarm.

Various methods of treatment were adopted. One patient died with the uterus still inverted and there were 3 recurrences of the inversion, so that some form of treatment was instituted 65 times. The uterus was replaced manually after removal of the placenta in 12 cases and in 28 cases in which the placenta was not attached,—a total of 40 manual replacements. There was one replacement with a Champetier de Ribes bag and one with an Aveling repositor. There were 12 replacements by vaginal operations, 3 by abdominal operations, and 2 by operations unspecified. In 1 case the inverted horn of a bicornate uterus was removed *per vaginam* after an exploratory laparotomy. Some form of hysterectomy was done in 5 other cases.

De Gaudino's case is worthy of emphasis in that manual replacement was done under spinal anesthesia. The history of the case is briefly as follows: An acute puerperal inversion was replaced at once. It recurred the next day. When de Gaudino saw the patient fifteen days later, the uterus was so friable that she was afraid to make much attempt at reduction. A week later a balloon was tried, but failed. Six weeks after admission to the hospital preparations were made for a Piccoli operation. Spinal anesthesia was given and the cervix became so relaxed that she was able to reduce the inversion by taxis. Some time ago when one of us studied the use of novocaine in obstetrics, the relaxation of the cervix that occurred with sacral anesthesia, convinced us that this form of nerve block would be useful in those cases of inversion in which the tightly contracted cervix offered an obstacle to the reduction of the inversion. De Gaudino's success with spinal anesthesia confirms our conviction and makes us feel that the epidural caudal anesthesia should be tried in such cases before resorting to the more or less shock-producing general anesthetics.

There were 9 deaths in the 59 cases in which the final outcome is recorded. They all occurred in the acute cases. Seven of them had an inversion that appeared at once; in one it was noted in eight hours and one the next day. In Levy's case, death occurred before any treatment could be instituted. In 6 cases, death followed the replacement in from a few minutes to a few hours. One case died of an embolus in the third week after a manual replacement, a recurrence and reduction with a balloon. The patient whose inversion was not discovered until the following day, died of sepsis a week later. Seven of the fatal cases were delivered by midwives, a mortality for the midwife cases of 26 per cent. The mortality in the cases delivered by physicians in the home was 12.5 per cent, whereas the mortality in the hospital cases was zero. It is probable that it was the prompt and efficient antishock treatment that was the important factor in these cases. Sepsis played a relatively less important rôle in causing death than did shock.

Mechanism.—The various stages in the process of inversion are as follows: First, an unnatural thickness of the uterine wall due to an adherent placenta or a sessile tumor, causes a loss of contractility of that portion of the uterine wall. It is conceivable that such a local change in contractility of the uterine muscle might come from various causes and that the adherent placenta, that is so common in these cases, is the result of such a change. It is surprising how few histologic studies of the uterine wall have been made in these cases. In Hillmann's second case, examination showed the entire thickness of the uterine wall in the region of the tumor had undergone sarcomatous degeneration.

Second, the contraction of the surrounding muscle fibers causes a dimpling or depression of the uterine wall at this point. This was noted in two cases at autopsy by Rokitansky. It was also noticed at operation by French. In our case one of us (Mason) distinctly noticed such a depression on the posterior wall just before the inversion occurred, but attached no importance to the observation at the time.

Third, the continued action of the uterine muscle acting on its indented wall as if it were a foreign body produces various stages of inversion both partial and complete. The length of time necessary for this to occur depends largely upon the activity of the uterus muscle. We would naturally expect that the acute cases would occur immediately after childbirth. At this time the uterus may act so energetically that the inversion occurs apparently instantaneously and may well simulate the mode of occurrence described by Taylor. Post-partum inversion may, however, occur more slowly and we find all stages of incomplete inversion. This is well illustrated by French's case. His patient had such profound shock an hour after delivery that rupture of the uterus was suspected. She was given blood transfusion and the abdomen was opened, but nothing was found except an irregularity on the posterior wall of the uterus. The patient left the hospital in good condition except for a bloody discharge, which continued for three weeks and then increased so much that an internal examination was made. The cervix was found to be dilated and grasping some two inches of the fundus.

SUMMARY

The cause of this accident when associated with neoplasms, and in the idiopathic cases and reinversions, is evidently in the uterus itself. The same mechanism, i.e., depression caused by some pathologic change in a portion of the uterine wall that interferes with the transmission of the wave of uterine contraction, introversion and perversion, readily accounts likewise for the puerperal cases when we take into consideration the greatly increased activity of the puerperal uterus. To explain *inversio uteri* simply upon a mechanical basis presupposes

not only an atonic uterus but also one that is no longer susceptible of stimulation, as the external violence that might cause the inversion would prove a powerful stimulant of uterine tone.

While the condition is rare, it is not so rare as it is commonly supposed to be. Such a possibility should always be borne in mind in the presence of profound shock or severe hemorrhage postpartum. The best treatment is the prompt institution of measures to combat shock, the replacement of the organ as soon as the condition of the patient permits, and the avoidance of infection. This is well illustrated by the mortality in the present series. In the hospital cases, where it is to be presumed the cases are recognized promptly and there are facilities for carrying out the treatment properly, the mortality was zero. In the group delivered in the home by physicians, where although the cases may be recognized promptly, there are not facilities for combating shock, the mortality was 12.5 per cent. In the group delivered by midwives where there was probably delay both in recognizing the condition and in instituting treatment, the mortality was 26 per cent.

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