

## INVERSION OF THE UTERUS AS A GYNAECOLOGICAL PROBLEM

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Acute inversion of the uterus is a rare phenomenon in obstetrics occurring approximately once in every 20,000 deliveries, and for every 4 such cases reported in the literature only one of gynaecological interest was found. 'Chronic' inversion of the uterus may be puerperal, idiopathic or occur with the expulsion of an intra-uterine tumour, usually a submucous fibromyoma. In a personal review of over 100 articles on inversion of the uterus interest was focused on the chronic variety but certain facts pertinent to both varieties must be included.

Seven cases of inversion of the uterus were recorded at Edendale Hospital in the 8-year period July 1954—July 1962. These cases will be summarized and discussed towards the end of this paper.

### DEFINITION AND CLASSIFICATION

Inversion of the uterus exists when the fundus invaginates below the level of the tubal ostia and becomes complete

when it has passed through the external cervical os. When complete, it is often associated with prolapse and a variable degree of inversion of the vagina which allows the fundus to descend beyond the introitus.

Kellogg's<sup>1</sup> classification of puerperal inversion of the uterus on a time basis in relation to the pathophysiology and management of the condition is the most practical. The condition is acute until contraction of the cervix interferes with the circulation in the inverted part of the uterus, producing congestion, oedema and a variable degree of ischaemia, possibly progressing to necrosis. This phase is usually established within 12 hours and the condition is then said to be subacute. Reposition by taxis is unlikely to succeed in this phase whereas it usually succeeds with little difficulty in the acute phase. When the condition has been present for 30 days it is called chronic and because involution of the uterus has taken place,



operative reposition is a simpler and safer procedure than it is in the subacute phase.

#### INCIDENCE

Figures comparing the incidence of the various types of inversion of the uterus taken from several large series of cases are shown in Table I.

TABLE I. COMPARING THE INCIDENCE OF INVERSION OF THE UTERUS IN DIFFERENT SERIES

Author	Total number of cases	Puerperal			Tumour		Idiopathic
		Acute	Sub-acute	Chronic	Benign	Malignant	
Thorn <sup>2</sup> (1911)	641	390	←141→		79	4	13 (+ 14 Autopsy)
Jones <sup>3</sup> (1913)	191	141	← 50 →				
Das <sup>4</sup> (1940)	391		← 295 →		46	7	
McCullagh <sup>5</sup> (1925)	233		← 200 →		27	6	
Williamson and Abercrombie <sup>6</sup> (1923)	89				83	6	
Berge (review)	257	148	32	52	18	5	2
Berge (Edendale Hospital cases)	7		1	4	2		

Puerperal inversion occurs predominantly in the third decade and it is commoner in primigravidae who comprise approximately 50% of the cases. The explanation usually given for this preponderance is that the placenta is more commonly situated at the fundus in primigravidae but this is difficult to substantiate and it is suggested that a tendency to uterine inertia may also play a part. It is rare for chronic puerperal inversion to persist untreated for longer than a year (only 9 of 51 cases in my review) and only 4 cases are recorded which had been present for more than 17 years: those of Tate<sup>7</sup>—42 years, Reeb<sup>8</sup>—25 years, Oldfield<sup>9</sup>—23 years, and Oliver<sup>10</sup>—18 years.

Tumour inversion occurs most commonly in the fourth decade. Das<sup>4</sup> described inversion in a patient aged 12 years and Jones<sup>11</sup> in a patient aged 87 years.

Mention of racial differences in incidence has not appeared in the literature but tumour inversion, which is mainly due to fibromyomata, could be expected to be more common in the Negroid peoples.

#### TUMOUR INVERSION

##### Aetiology and Pathogenesis

A tumour, usually fundal, and sessile or having a short pedicle, growing into and enlarging the uterine cavity and producing a localized weakness in the uterine wall at its base, sooner or later stimulates expulsive uterine action. The final stimulus may be sudden increase in size of the tumour owing to haemorrhage or inflammation within it.

That part of the tumour which has passed through the cervix is subject to circulatory stasis and inflammation and may become necrotic.

The causative tumour is nearly always a fibromyoma. In my review there were 25 cases of tumour inversion divided up as follows:

Simple fibromyoma	17
Fibromyoma with sarcomatous degeneration	3
Endometrial carcinoma	1
Endometrial sarcoma	1
Mixed mesodermal tumour	1
Not specified	1
Adenomyoma	1

##### Clinical Features

Labour pains accompany dilatation of the cervix and extrusion of the tumour and there may be bleeding. The degree of inversion of the uterus is variable. If severe pain, haemorrhage or shock brings the patient to seek aid immediately, the condition has been described as acute tumour inversion. The process may be more protracted and associated with few symptoms and the patient may present later, complaining of vaginal bleeding or discharge, low pelvic discomfort, or even a mass at the introitus. Other features similar to those of chronic puerperal inversion may also be present.

The diagnosis and treatment will be discussed together with chronic puerperal inversion. The prognosis depends to a large extent on whether or not the tumour is malignant.

#### IDIOPATHIC INVERSION

This extremely rare entity is difficult to explain. One of the 2 cases in my review had previously had an extensive amputation of the cervix. A possible explanation for some of these cases may be that an incomplete puerperal inversion, missed at the time of delivery, later becomes complete. This is known to have occurred (see below).

#### PUERPERAL INVERSION

##### Aetiology

A very exceptional set of circumstances must obtain for the rare phenomenon of acute puerperal inversion to occur. It is usually a dramatic event occurring during, or following, the third stage of labour, is usually complete and associated in the majority of cases with severe shock and serious haemorrhage.

Incomplete inversion may pass unnoticed. Cases are on record in which spontaneous reposition has occurred but, on the other hand, Barrett<sup>12</sup> observed the gradual progress of one case of incomplete inversion which eventually became complete over a period of 16 years in a patient who refused treatment.

Acute puerperal inversion can occur in 2 ways. Either the fundus becomes indented and acts as the apex of the inversion to emerge first through the cervix; or a progressive eversion begins at the cervix, the fundus emerging last.<sup>13</sup> The former mechanism is the more usual, and for it to occur a portion of the uterus, usually the fundus, must be thin, soft and atonic at a moment during or immediately following the third stage of labour so that a traction or pulsion force exerted at precisely the correct moment before contraction and retraction occurs will produce inversion. The required force may be produced by traction on the placenta or cord, extrinsic localized pressure, raised intra-abdominal pressure (coughing, straining or delivery in a sitting or squatting posture) and possibly a suction effect during delivery of the body of the infant. Fundal implantation of the placenta is an important factor frequently producing inversion with the placenta still attached (57 cases of 181 in my review). Fundal implantation allows traction to be applied effectively and it is also postulated that the myometrium is thinner and softer at the placental site on account of its vascularity, and less active due to the local inhibitory effect of placental hormones.

Some authorities have stated that the incidence of inver-



sion closely approximates the incidence of true fundal implantation of the placenta. The reason for the rarity of fundal implantation is unknown because if implantation took place at random, by area the fundus would include about 10%. There may be uterine 'margenstrassen' or common pathways to channel the sperm in one direction and the fertilized ovum in the other (Fig. 1).

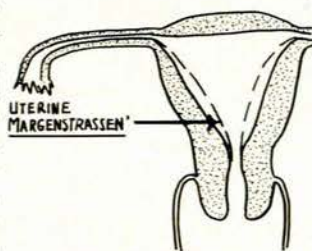


Fig. 1. See text.

Five cases of inversion have been reported in association with placenta praevia, therefore fundal implantation is not an absolute prerequisite. Minor uterine anomalies do not appear to be important but 5 instances of puerperal inversion of the non-pregnant horn of a uterus didelphus and 2 of the pregnant horn have been reported.<sup>14</sup> Two cases of puerperal tumour (fibromyoma) inversion were found in my review.

The second important factor in analysis of reported cases is extrinsic pressure on the relaxed uterine fundus. 'Violent' mismanagement of the third stage of labour has been responsible, but it is estimated that approximately 50% of inversions occur spontaneously.

#### PATHOLOGY

The circulatory changes which occur with the passage of time in the inverted uterus have been described. Sepsis frequently complicates the condition in the subacute and chronic phases and may lead to pelvic thrombophlebitis. Involution of the uterus occurs but ischaemic and inflammatory changes produce irreversible damage of variable extent to the myometrium and endometrium, which may be replaced by granulation tissue (Fig. 2). Neoplastic change has been observed in long-standing cases.



Fig. 2. Microphotograph of section of uterine wall from case 6, showing chronic inflammatory change in endometrium.

#### CLINICAL FEATURES

##### Chronic Inversion

The clinical features and management of acute inversion are beyond the scope of this paper. In the chronic variety the patient usually gives a history of a stormy puerperium

associated with excessive bleeding and sepsis. With involution of the uterus this becomes less, or ceases altogether, to be followed by excessive bleeding at the time of the menses, intermenstrual and contact bleeding, dyspareunia and a chronic vaginal discharge. Retention of urine or difficulty in micturition has occasionally been reported (2 cases in my review). A mass in the vagina or a sensation of something coming down, together with low pelvic pain, are inconstant complaints. Malaise, anorexia, tiredness and chronic ill health are frequent symptoms and the symptoms of cardiac failure may be present if the degree of anaemia is severe enough. The patient may present with intercurrent disease brought about by lowered resistance to infection, and urinary tract infection is frequently a feature.

On examination the general condition of the patient is frequently found to be poor and anaemia is an almost constant finding.

##### Diagnosis

On vaginal examination a smooth, rounded, firm, red mass is found in the upper vagina (Fig. 3) and the differential diagnosis lies between:

1. Inversion of the uterus,
2. Polyp or tumour without inversion, and
3. Polyp or tumour with partial or complete inversion.

On bimanual examination absence of the corpus uteri with a depression felt at the upper pole of the mass is an important diagnostic feature of inversion and the cervix will be felt firm, dilated and thinned out as a constricting ring through which the mass protrudes. The depth to which a sound can be passed between the mass and the cervix will assist in deciding on the degree of inversion in tumour cases.

At laparotomy the vortex appearance of the fallopian tubes, round and ovarian ligaments entering the constricting ring is unmistakable (Fig. 4).

##### Management

1. *Chronic puerperal inversion and idiopathic inversion.* Reposition with possible preservation of reproductive function should be the aim in a young patient, while hysterectomy is the rule in older patients in whom the inversion has usually been of long standing.

2. *Tumour inversion.* Fibromyomata should be removed vaginally. The uterus can then be dealt with as above. Malignant tumours have usually been treated by irradiation alone or followed by radical hysterectomy.

In most cases intensive supportive therapy aimed at the correction of anaemia, the eradication of sepsis and the improvement of the patient's general condition has to be given before definitive treatment can be carried out.

A variety of operative techniques have been described. The constricting cervix has to be incised before the inverted uterus can be repositioned because taxis is hardly ever effective and Aveling's repositor or modifications thereof give inconsistent results. The vaginal or abdominal approach can be used according to the findings and the ring can be incised in the midline anteriorly or posteriorly. Because a portion of the bladder is often drawn into the ring and can be damaged by an anterior incision I feel that Haultain's<sup>15</sup> procedure is better when the abdominal approach is used. Most operators favour the Spinelli procedure (anterior incision) when using the vaginal approach.



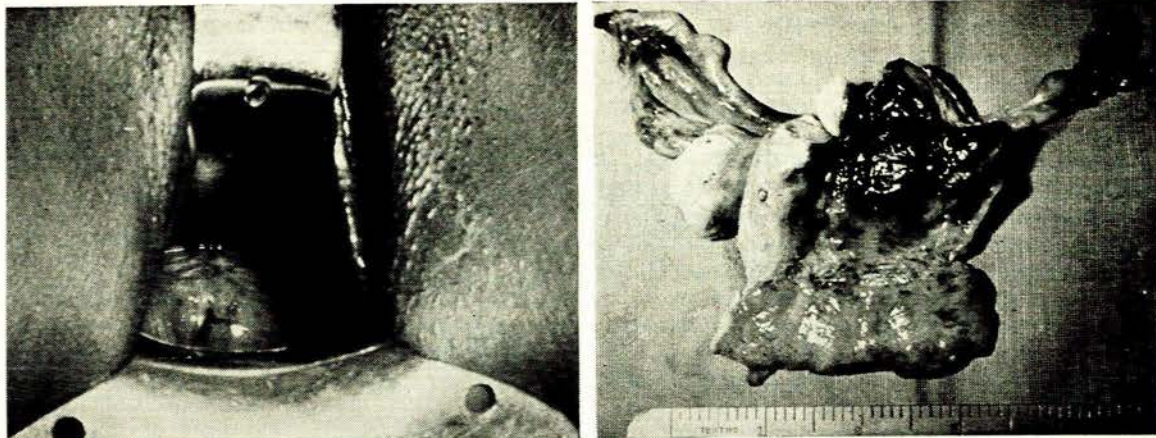


Fig. 3 (Left). Appearance of vaginal mass, case 6. (Right). Specimen of total hysterectomy and bilateral salpingo-oophorectomy. The uterus opened posteriorly, showing the dilated cervix and the inverted fundus dyed with Bonney's blue (appears black on photograph).

**Prognosis**

Figures from my review are summarized in Table II.

TABLE II. COMPARISON OF PUERPERAL AND TUMOUR INVERSION

	Puerperal inversion		Tumour inversion
	Acute and subacute	Chronic	
Mortality	37 in 180 cases (20.4%)	2 in 55 cases	4 in 25 cases unknown in 6
Subsequent pregnancy	24 in 144 cases (16.8%)	4 patients with 9 pregnancies in all out of 55 patients	Nil
Recurrence of inversion in subsequent pregnancy	4 in 28 pregnancies (24 patients)	Nil	Nil
Rupture of operative scar in subsequent pregnancy	4 in 28 pregnancies with 2 deaths (all Spinelli scars)	Nil	Nil

The outlook for a future pregnancy is poor following reposition of a chronically inverted uterus because of irreversible changes in the endometrium.

TABLE III. SUMMARIES OF THE MAIN FEATURES

Case no.	Age	Parity	Gravidity	Type of inversion	Aetiological factor	Treatment
1	47	13	15	Tumour. Acute symptoms of 2 days' duration. Complete	Fibromyoma	Vaginal myomectomy and reposition; abdominal total hysterectomy later
2	38	2	3	Chronic puerperal. Complete. 11 years' duration	Postabortal 16 weeks' pregnancy	Reposition by Haultain's <sup>15</sup> technique, followed by total hysterectomy
3	65	7	7	Tumour. Symptoms of one month duration. Complete	Adenomyoma of uterus	Biopsy of vaginal mass; subsequent abdominal total hysterectomy
4	39	5	5	Acute puerperal, complete. Not diagnosed until subacute phase. Allowed to become chronic (2 months)	Puerperal	Conservative treatment initially; followed by Haultain's <sup>15</sup> procedure
5	26	4	4	Acute puerperal. Complete with inversion of vagina. Severe shock	Fundal. Implantation of placenta accreta	Treatment of shock followed by reposition at 14 hours using O'Sullivan's <sup>16</sup> hydrostatic pressure method
6*	42	3	3	Chronic puerperal, complete. 17 years' duration causing menorrhagia, contact bleeding, anaemia, cachexia	Puerperal	Intensive supportive treatment pre-operatively followed by abdominal total hysterectomy and bilateral salpingo-oophorectomy after reposition of the uterus using Haultain's <sup>15</sup> incision
7*	21	1	1	Chronic puerperal. Complete. 2 years' duration. Menorrhagia, anaemia (Hb. 6.1G/100 ml.)	Puerperal, apparently spontaneous	Packed cell transfusions from 4 pints of blood. Haultain's <sup>15</sup> procedure

\*Personal cases.

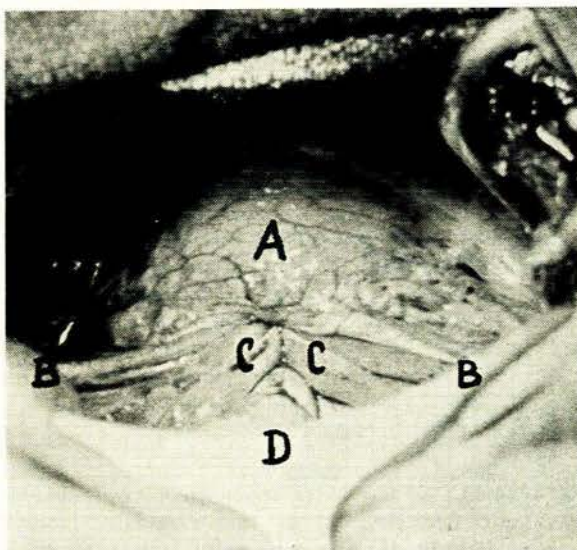


Fig. 4. Findings at laparotomy in case 6. A = Bladder; B = Round ligaments; C = Fallopian tubes; D = Ovary.



## CASE SUMMARIES AND COMMENT

Summaries of the main features of the 7 cases (of which 2 were personally treated) appear in Table III.

During the 8-year period mentioned, acute inversion did not occur in over 34,000 hospital deliveries. The 2 patients seen were admitted in profound shock following delivery. One of these was treated conservatively and the uterus repositioned after 2 months, while the other was somewhat unusual in that O'Sullivan's<sup>16</sup> hydrostatic method was very successful at 14 hours when manual reposition had failed.

With reference to case 2, only 3 other cases of inversion following abortion were found in my review of 232 cases of puerperal inversion.

Case 3 presented with symptoms for 1 month of lower abdominal pain, incontinence of urine, irregular vaginal bleeding and a profuse vaginal discharge. Four large polypoid masses together the size of a man's fist were found attached to a completely inverted uterus. Biopsy showed uterine muscle honeycombed with small cysts lined by endometrium (adenomyoma). This case is to my knowledge unique.

## SUMMARY AND CONCLUSIONS

1. Inversion of the uterus is met with very infrequently as a gynaecological problem.

2. The incidence of chronic puerperal inversion should decrease with universal improvement in obstetrical care.

3. Tumour inversion can occur at any age and since it is infrequently associated with malignancy the over-all results of treatment can be expected to be good.

4. A review of part of the literature on inversion of the uterus was undertaken in order to provide a basis for discussion and comparison with 2 personal cases and 5 cases collected from the records of Edendale Hospital.

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