

# UTERINE PERFORATION DURING ELECTIVE FIRST TRIMESTER ABORTIONS: A 13-YEAR REVIEW

L H Chen, S F Lai, W H Lee, N K Y Leong

## ABSTRACT

**Objective:** The purpose of this study was to determine the incidence, presentation, management and outcome of uterine perforation during elective first trimester abortions.

**Methods:** We conducted a retrospective study of 40 patients, including 2 transferred patients, who sustained uterine perforation during elective abortions from January 1980 to December 1992.

**Results:** The incidence of uterine perforation was 0.8 per 1,000 procedures (0.08%). There were 8 (20%) nulliparae and 3 (7.5%) grand multigravidae. 82.5% of the cases occurred when the abortion was performed by medical officers or junior registrars under training. The commonest perforating instrument was the suction cannula (25%) followed by the uterine sound (22.5%) and the dilator (20%). Three (7.5%) cases were treated conservatively, 33 (82.5%) cases underwent emergency operation, 2 (5%) cases were discovered during subsequent sterilisation, and 2 (5%) cases suffered undiagnosed perforation and were re-admitted for emergency surgery. Morbidity included post operative fever (12.5%), bowel injury (7.5%), retained conceptus (5%) and wound breakdown (2.5%). There was no mortality.

**Conclusion:** A careful assessment of the uterine size and position, vigilance in the use of uterine sound and dilators, greater care in the use of suction cannula, and experience in vacuum aspiration will decrease the incidence of uterine perforation during elective abortions. A high degree of suspicion, early diagnosis and treatment will prevent the potential complications that may arise from uterine perforation.

**Keywords:** uterine perforation, elective first trimester abortion, morbidity.

SINGAPORE MED J 1995; Vol 36: 63-67

## INTRODUCTION

Elective abortions up to 24 weeks of gestation is legally practised in Singapore (Abortion Act 1974). In Kandang Kerbau Hospital, Singapore, vacuum aspiration is routinely used for first trimester abortions. The superiority of vacuum aspiration over dilatation and curettage for first trimester abortions is well documented<sup>(1)</sup>. For second trimester abortions, intravenous prostaglandin (Sulprostone<sup>®</sup>) is used in our hospitals although some studies suggested that cervical dilatation and evacuation (D&E) is a safer method for second trimester abortion<sup>(2,3)</sup>.

There are several complications associated with elective abortions. Early complications include uterine perforation, blood loss, retained products of conception, postabortal secondary haemorrhage, endometritis, pelvic infections, and peritonitis. Late complications are less well defined, and may include secondary infertility, ectopic pregnancy, cervical incompetence, endometrial synechiae and endometriosis<sup>(1)</sup>.

Uterine perforation is a rare but potentially life-threatening complication of elective abortion. It may lead to intestinal trauma, necessitating bowel resection or colostomy, or to uncontrollable haemorrhage requiring hysterectomy<sup>(4)</sup> or resulting in death<sup>(5)</sup>.

In this paper, we aim to study the incidence, management and outcome of uterine perforations sustained during first trimester abortions in our hospital.

## MATERIALS AND METHODS

From January 1980 to December 1992, 49,230 cases of elective first trimester abortions were performed in Kandang Kerbau Hospital, Singapore. Patients requesting for abortion were seen at the outpatient clinic where the gestation of pregnancy was assessed. When there was a discrepancy between the period of amenorrhoea and the uterine size, an ultrasound examination to date the pregnancy was performed. Only pregnancy of 12 weeks gestation or less would be selected to undergo vacuum aspiration abortion.

Vacuum aspiration abortion was performed under regional anaesthesia prior to 1985, and under general anaesthesia after 1985. This was the policy laid down by the hospital. During the procedure, vaginal examination under anaesthesia was performed to determine the size and position of the uterus. The length of the uterus was then sound as a routine. Subsequently, the cervix was gradually dilated with increasing sizes of Hegar dilators to size 8. The product of conception was removed under suction (Berkeley vacuum pump, Inchcap-Parish, UK) with a size 8 flexible cannula (Karman's cannula). Finally, a curettage was performed to ensure that the uterine cavity had been emptied completely.

There were 40 cases of uterine perforations during this period, including 2 cases which were transferred to our hospital for management. The case records were reviewed for patient profile, characteristics of the injuries, treatment, postoperative course and complications.

## RESULTS

During the 13-year period, 49,230 cases of first trimester abortions were performed in Kandang Kerbau Hospital of which there were 38 cases of uterine perforations. Two cases of uterine perforation were transferred from private clinics. The incidence

---

Department of Reproductive Medicine  
Kandang Kerbau Hospital  
1 Hampshire Road  
Singapore 0821

L H Chen, MBBS  
Medical Officer

S F Lai, MBBS, M Med (O & G), MRCOG (Lond)  
Registrar

W H Lee, MBBS  
Medical Officer

N K Y Leong, MBBS, M Med (O & G), FRCOG (Lond), FAMS  
Head and Senior Consultant

Correspondence to: Dr L H Chen

---

of uterine perforations was 0.8 per 1,000 procedures (38/49,230 cases).

The mean age of the patients was  $30 \pm 7$  years (range 19 to 46 years). About 75% of the patients were between 21 to 35 years old. The mean parity was  $2.1 \pm 2$  (range 0 to 11). There were 8 nulliparae (20%) and 3 grand multigravidae (7.5%). The great majority (87.5%) were of parity 3 or less.

Cervical priming prior to abortion was performed routinely for nulliparae. None of the multigravidae received cervical priming. Out of the 8 nulliparae, 2 were transferred patients and the method, if any, of cervical priming was not specified. For the remaining 6 nulliparae, 4 (10%) received prostaglandin E<sub>2</sub> vaginal pessary (Cervagem<sup>®</sup>) and 2 (5%) received intramuscular prostaglandin E<sub>2</sub> (Sulprostone<sup>®</sup>).

Excluding the 8 nulliparae, the mean interval from the last delivery was 48.2 months (SD 4 years, range 4 months to 18 years). Fifty-six percent of the patients had delivered within the last 2 years prior to the abortion. The distribution of interval from last delivery is shown in Table I.

**Table I – Interval from last delivery**

Interval from last delivery	Number (%)
0- 6 months	2 ( 6%)
7-12 months	8 ( 25%)
1- 2 years	8 ( 25%)
3- 6 years	5 ( 16%)
7-10 years	8 ( 25%)
More than 10 years	1 ( 3%)
Total	32 (100%)

The commonest past history was previous abortion or dilatation and curettage (32.5%). Three patients (7.5%) had a previous Caesarean delivery. None of the patients had uterine perforation previously (Table II).

**Table II – Past gynaecological history**

Past history	Number (n=40)
Abortion or dilatation and curettage	13 (32.5%)
Caesarean section	3 ( 7.5%)
Endometriosis	1 ( 2.5%)
Ectopic pregnancy	1 ( 2.5%)

Eighteen cases (45%) of abortions were performed under regional anaesthesia as was the practice in our hospital prior to 1985. The majority of the patients (55%), including the 2 patients who were transferred from the private gynaecologists, had the procedure under general anaesthesia.

More than half (55%) of the uterine perforations occurred when the abortion was performed by medical officers under training. Together with abortions performed by junior registrars on training, these 2 groups accounted for 82.5% of all cases of uterine perforation.

The mean duration of gestation was  $7.6 \pm 1.2$  weeks amenorrhoea (Range 5 to 12 weeks) (Table III). The average volume of product of conception aspirated was 91.5 ml (range 20 to 380 ml) excluding those without any aspirate.

Uterine perforations occurred more commonly at the anterior and posterior walls (Table IV). The anterior wall of the uterus was more commonly involved when the uterus was retroverted

(20%) and the posterior wall was more commonly involved in an anteverted uterus (25%). There were more anteverted uterus (45%) than retroverted uterus (35%) involved. Other sites of perforation, such as the lateral wall of the uterus and the cervix, were involved when the uterine attitude was not determined before the procedure. The sites of uterine perforation in the 3 patients who were observed were not determined.

**Table III – Uterine size in weeks**

Uterine size in weeks	Number (%)
6 weeks or less	11 (27.5%)
7 to 9 weeks	22 (55 %)
10 to 12 weeks	7 (17.5%)
Total	40 ( 100%)

**Table IV – The site of uterine perforation and uterine attitude**

Site	Uterine attitude				Total
	Anteverted	Retroverted	Axial	Unknown	
Anterior	0	8 ( 20%)	1 (2.5%)	0	9 (22.5%)
Posterior	10 ( 25%)	3 (7.5%)	2 ( 5%)	1 ( 2.5%)	16 ( 40%)
Fundus	6 ( 15%)	1 (2.5%)	0	1 ( 2.5%)	8 ( 20%)
Corua	1 (2.5%)	0	0	0	1 (2.5%)
Lateral	0	0	0	1 ( 2.5%)	1 (2.5%)
Cervix	0	1 (2.5%)	0	1 ( 2.5%)	2 ( 5%)
Unknown	1 (2.5%)	1 (2.5%)	0	1 ( 2.5%)	3 (7.5%)
Total	18 ( 45%)	14 (35%)	3 (7.5%)	5 (12.5%)	40 (100%)

The commonest perforating instrument was the suction cannula (25%), followed by the uterine sound (22.5%) and the uterine dilator (20%). The perforating instrument was not identified in 6 cases (2 found during subsequent sterilisation, 2 undiagnosed perforation, and 2 cases where the instrument could not be determined with certainty) (Table V).

Most perforations were suspected either before suction (42.5%), or during curettage (25%). Two cases (5%) were diagnosed during subsequent sterilisation, and 2 cases (5%) were diagnosed more than 24 hours later (Table VI).

**Table V – Instruments causing uterine perforation**

Instrument	Number
Uterine sound	9 (22.5%)*
Uterine dilator	8 (20.0%)
Suction cannula	10 (25.0%)
Curette	7 (17.5%)
Unknown	6 (15.0%)**
Total	40 ( 100%)

\* Including 2 patients referred from private gynaecologists.

\*\* 2 were found during subsequent sterilisation, another 2 were undiagnosed perforations, and in the remaining 2 the instrument could not be determined with certainty.

Two patients in whom the diagnosis was not suspected at the initial procedure, underwent emergency operations subsequently. The first patient was a nullipara at 6 weeks of amenorrhoea who was found to have scanty aspirate and curetting

**Table VI – Time of detection of uterine perforation**

Time of detection	Number (%)
Before suction	17 (42.5%)
During insertion of suction cannula	5 (12.5%)
At the end of suction	4 (10.0%)
At check curettage	10 (25.0%)
During sterilisation	2 ( 5.0%)
Delayed diagnosis	2 ( 5.0%)
Total	40 ( 100%)

during the abortion. An urgent ultrasonography was done, which showed a bicornuate uterus with an intact intrauterine gestation in one horn. The perforation was discovered when evacuation of the uterus was performed the next day.

The other patient underwent an uneventful abortion at 8 weeks amenorrhoea as a day surgery procedure and was discharged the same day. She was seen at the hospital's Emergency Department the next day with complaints of lower abdominal pain and bleeding per vaginam. However she refused admission despite explanation of the risks involved. She was seen again the subsequent day with worsening of her symptoms. Examination showed a guarded abdomen. She underwent an emergency laparotomy and repair of uterine perforation the same day. She was well postoperatively.

After diagnosis of uterine perforation was made, 3 cases (7.5%) were admitted to hospital for observation, and 37 cases (92.5%) underwent immediate surgery. None of the observed cases required emergency surgery subsequently. Details of management are shown in Table VII.

**Table VII – Management of uterine perforations**

Management	Number (%)
Observation alone	3 ( 7.5%)
Laparoscopy	
1) only	2
2) directed abortion	1
Subtotal	3 ( 7.5%)
Laparotomy and repair	
1) without ligation	18
2) with ligation	10
3) with ligation and sigmoid stitch	1
Subtotal	29 (72.5%)
Hysterotomy	
1) without ligation	3
2) with ligation	2
Subtotal	5 (12.5%)
Hysterectomy	0
Total	40 ( 100%)

The type of surgery performed depend on the extent of damage and suitability for repair, and on the patient's wish for further fertility. Only 6 patients (15%) did not require repair of the uterine perforation (3 were observed and 3 had laparoscopy to assess the bleeding). The majority (72.5%) had laparotomy and repair of the rent in the uterus with or without ligation. During the laparotomy, the uterine cavity was evacuated from the vaginal route under direct vision if the abortion had been incomplete.

However, in 5 patients (12.5%), it was not possible to enter the uterine cavity via the cervix due to the creation of a 'false passage'. A hysterotomy was performed in order to evacuate the uterine cavity. A total of 13 patients (32.5%) were ligated. None of the patients required a hysterectomy.

In addition to the uterine injury, 3 patients (7.5%) suffered concomitant bowel injury, all involving the sigmoid colon. Two of the injuries were caused by the suction cannula and the remaining one by the Hegar dilator. The perforation was on the posterior wall in 2 patients, and at the fundus in one patient. Only one case required a haemostatic stitch for a subserosal haematoma. The other 2 cases sustained slight bruising of the serosa and appendices epiplocae and no further treatment was necessary. All 3 patients were well postoperatively.

Three patients (7.5%) were found to have a bicornuate uterus at laparotomy. In 2 patients, the perforation occurred in the horn contralateral to the pregnancy. In the other, a false passage was created on the same side as the conceptus. One of the patients had undergone a previous abortion and Caesarean section without mishap.

One patient (2.5%) was found to have a left tubal ectopic pregnancy when she underwent a laparotomy for repair of uterine perforation. As she had completed her family, bilateral salpingectomy was performed.

In the postoperative period, the majority (80%) of the patients were well. The commonest complication was post operative fever (12.5%). Two patients (5%) had retained products of conception requiring repeat evacuation of the uterus. One patient (2.5%) had laparotomy wound breakdown. The average duration of hospitalisation was  $4.1 \pm 2$  days (range 0 to 8 days). Patients who were either observed or had laparoscopy performed only had fewer complications (only one had retained conceptus) and shorter hospital stay (mean  $1.2 \pm 0.6$  days, range 0 to 2 days) compared to those who had laparotomy performed (mean  $4.7 \pm 2.8$  days, range 2 to 8 days).

**Table VIII – Incidence of uterine perforation during first trimester abortions**

Reference	No. of abortions	No. of uterine perforations	Incidence per 1000
Beric and Kupresanin <sup>(6)</sup>	22,909	13	0.4
Nathanson <sup>(7)</sup>	30,000	24	0.8
Grimes, Schulz and Cates <sup>(4)</sup>	67,175	66	0.9
Kaali, Szigetvari and Bartfai <sup>(8)</sup>	6,408	8	1.3
Freiman and Wulff <sup>(9)</sup>	20,000	28	1.4
Mittal and Misra <sup>(10)</sup>	9,344	37	4
Present series	49,230	40	0.8

## DISCUSSION

Uterine perforation is a serious but preventable complication of abortion. There is much variation in the technique, safety guidelines and recommendations in performing the procedure, as well as in the overall incidence reported. The incidence of 0.8 per 1,000 procedures in our hospital compares favourably with previous reports (Table VIII). We believe that occurrence of uterine perforation during abortion can be minimised. Factors that are responsible for the complication have been highlighted in various reports<sup>(4,6-10)</sup>. It is important to identify the common factors that caused uterine perforation and amelioration of such factors may be the key to reduction of the incidence of uterine perforation during abortion.

In our series, 4 cases (10%) of uterine perforation were not diagnosed during the vacuum abortion. The true incidence of uterine perforations has been found to be significantly underestimated. In the series reported by Kaali<sup>(9)</sup> the incidence of perforation discovered during sterilisation after the abortion was more than 10 times that diagnosed during the abortion. Similar conclusions were reached by other authors<sup>(11)</sup>. This will mean that many cases of undiagnosed uterine perforations were discharged home after the abortion. Some of these cases may have serious complication subsequently. These undiagnosed uterine perforations are usually asymptomatic and detection may be difficult. Hence it is imperative that patients are asked to return for assessment if they do not feel well after the abortion and undiagnosed uterine perforation then has to be excluded.

In general, legal abortions are performed for women between 20-30 years of age. It seems that young age (of less than 17 years old) at abortion is not a risk factor for uterine perforation<sup>(4)</sup>, while advanced age has been found to predispose to uterine perforation<sup>(8)</sup>. Parity is generally related to the maternal age, and a higher incidence of uterine perforation is found amongst the multigravidae<sup>(8)</sup>. It has been reported that multiparae were 3 times more likely than nulliparae to suffer from uterine perforation during elective abortion, and 15 times more likely to sustain trauma during insertion of intrauterine contraceptive devices<sup>(4)</sup>. However the association of uterine perforation with parity has been disputed by other author<sup>(7)</sup>.

Whether cervical priming before the abortion to facilitate dilatation of the cervix will minimise the risk of uterine perforation is still controversial. Cervical priming prior to dilatation for abortion was routinely performed for nulliparae in our hospital. There were 6 nulliparae (15%) (excluding the 2 nulliparae referred by private gynaecologist) who underwent abortion in our hospital in this series, of which 4 received prostaglandin E<sub>2</sub> vaginal pessary while 2 had intramuscular prostaglandin E<sub>2</sub>. Cervical priming with laminaria tent is found to have a protective effect, with a relative risk (RR) of 0.17<sup>(4)</sup>. However, the result is not statistically significant. In another series, the laminaria (Lemcel<sup>®</sup>) tent is found to be an efficient method to soften the cervix without a corresponding decrease in the rate of uterine perforation<sup>(12)</sup>. The use of intracervical prostaglandin E<sub>2</sub> (Prostin<sup>®</sup> E<sub>2</sub>) is similarly found not to protect against uterine perforation during abortion<sup>(13)</sup>. We feel that cervical priming does not reduce the incidence of uterine perforation during abortion. However, we continue to use cervical priming primarily because it makes the abortion technically easier as the cervix is softer and easier to dilate.

A higher incidence of uterine perforation is found if abortion is performed within 6 months of delivery<sup>(10)</sup> because the uterus is softer and easily traumatised. It has been suggested that abortion should be avoided in patients who have been pregnant recently<sup>(7)</sup>. In our study, 2 patients (6%) had delivered within 6 months prior to the abortion. It is not known what is the best approach to perform abortion for patients who have delivered recently, if the abortion cannot be delayed. The use of oxytocin during the abortion to contract the uterus may decrease the incidence of uterine perforation. We feel that the best approach will be for an experienced surgeon to perform such abortion when necessary.

Among those with a significant past gynaecological history, previous evacuation or dilatation and curettage was the commonest (32.5%), followed by previous Caesarean sections (7.5%). One patient (2.5%) had a history of endometriosis and another (2.5%) had salpingectomy for ectopic pregnancy. In the last 2 patients, adhesions between the uterus, gut and abdominal wall were found at laparotomy. This may have contributed to

the occurrence of uterine perforation during the abortion. Patients who expose themselves to repeated episodes of abortions are naturally at an increased risk of uterine perforation. Uterine abnormality is a risk factor for uterine perforation<sup>(4)</sup>. In this series, 3 patients (7.5%) were found to have a bicornuate uterus. In 2 patients, the perforation occurred in the horn contralateral to the pregnancy and in the other, a false passage was created on the same side as the conceptus.

It has been reported that uterine perforation rate is higher when general anaesthesia is used because the uterus is softer than when local anaesthesia is used<sup>(14)</sup>. In another series, 89% of the uterine perforations occurred during general anaesthesia and 11% during paracervical block during abortion<sup>(8)</sup>. The use of general anaesthesia is associated with a twofold to fourfold increased risk of death from first trimester abortion<sup>(14)</sup>. Despite the higher risk of complication, abortions are performed under general anaesthesia in most centres because of better patient acceptability. This is the case in our hospital.

Several studies have found that the risk of uterine perforation is related to the seniority and experience of the surgeons performing the abortion<sup>(6,7,9,15)</sup>. Abortions performed by surgeons under training is found to be a significant risk factor for uterine perforation, with a relative risk (RR) of 5.5<sup>(4)</sup>. In our series, 55% of the uterine perforations occurred when the abortion was performed by medical officers under training. This was partly due to the fact that the majority of abortions were performed by medical officers in our hospital.

In our study, the majority (55%) of the uterine perforations occurred between the 7th to 9th week of amenorrhoea. This is because of the hospital's policy of encouraging first trimester abortions at 8 to 10 weeks of gestation. The risk of uterine perforation is found to be correlated to the gestation, with a relative risk of 1.4 for every 2 weeks increase in gestation<sup>(4)</sup>. We continue to recommend that first trimester abortions be performed between 8 to 10 weeks gestation because it is safer than abortion in more advanced gestation. Moreover it is more difficult to dilate the cervix in uterus of less than 8 weeks gestation<sup>(9)</sup>.

In our study, posterior perforation was the commonest (40%), followed by anterior (22.5%) and fundal (20%) perforations. In other series, the commonest sites of perforation are the anterior (50%)<sup>(7)</sup>, isthmic (40%)<sup>(1)</sup>, and fundal or cornual (37.5%)<sup>(10)</sup>. The site of perforation is important because it puts the organs at that anatomical site at risk of injury. While there is little consensus about the commonest site of perforation, most authors agree that uterine position is a critical factor in determining the site of perforation, and whenever there is a discrepancy between the surgeon's estimates and the actual uterine size and position, perforation is likely<sup>(7,10)</sup>. Several studies reported that almost 60% of uterine perforations occurred when the uterus is retroverted<sup>(7,10)</sup>. In our series, only 35% of the cases had retroverted uterus and in Grime's series<sup>(4)</sup>, only 9% had retroverted uterus.

We have found that the dilator, suction cannula and uterine sound are about equally responsible for causing perforation, which was similar to other reports<sup>(1,7,16)</sup>. Authors who avoided the use of uterine sound during the abortion found that the suction cannula is the commonest instrument causing the uterine perforation, accounting for up to 50% of all cases<sup>(10,17)</sup>.

The routine use of uterine sound is controversial<sup>(16)</sup>. About 20% of uterine perforations during first trimester abortions are caused by this instrument. In order to minimise the risk of uterine perforation, several authors have recommended that the uterine sound should only be used to determine the size and position of the uterus when in doubt<sup>(8,15)</sup>. It has been further recommended that the dilator and cannula should be passed just inside the internal os, and as much as possible of the conceptus should be

sucked from that position<sup>(10)</sup>. Only when the uterus was contracted and firmer should the cavity be explored with a curette.

We feel that neither the dilator, the suction cannula, nor the uterine sound should be incriminated as the culprit for the uterine perforation. The experience of the operator of these instruments is the main determining factor in causing the uterine perforations. The training of surgeons should concentrate on learning the use of these instruments safely. As an added precaution, the abortion may be performed under ultrasound guidance. Ultrasonography can indicate the direction and depth of the uterine cavity which will allow the evacuation of products of conception without undue pressure on the uterine walls. The efficacy of intraoperative ultrasonography guidance in reducing the incidence of uterine perforation in second trimester abortion has been reported<sup>(18)</sup>, and the use of transrectal ultrasound guidance in intrauterine procedures has also been described<sup>(19)</sup>. However, intraoperative sonographic guided abortions will mean additional costs and longer operation time, and each hospital will have to decide whether the use of ultrasound during abortion is feasible in their own circumstances.

The majority (55%) of cases of uterine perforation were detected before the commencement of suction aspiration. In another study, 64.8% of uterine perforations cases were diagnosed during or after suction<sup>(10)</sup>. The early diagnosis of uterine perforation and discontinuation of the abortion prior to the commencement of suction aspiration is important in lessening the extent of possible injury. The high negative pressure transmitted through the suction cannula can easily traumatise the abdominal viscera, especially the bowel.

The management of uterine perforation depends upon various factors, including the site of perforation, the causative instrument, the completeness of evacuation, and associated visceral injuries. It has been suggested that surgical exploration by laparoscopy or laparotomy should be performed for all cases<sup>(16,20)</sup>. Laparoscopy is recommended for patients in whom no extra-uterine tissue has been evacuated during the procedure, who are not in shock, not obese and have no previous abdominal surgery. Otherwise a laparotomy is performed<sup>(16)</sup>. With the advent of minimally invasive surgery (MIS), exploration and repair may be performed laparoscopically. On the other hand, several authors recommend that if the uterus is completely evacuated, the patient may be kept under observation provided that the perforation is not in the lateral wall and suction cannula is not used<sup>(1,9,10)</sup>. However, without laparoscopy or laparotomy, bowel injury may not be identified early. We recommend that laparoscopy be performed when the diagnosis is in doubt.

The commonest complication was post operative fever (12.5%), followed by bowel injury (7.5%) and retained product of conception (5%). The bowel injuries were not severe and did not require bowel resection. This is the result of early diagnosis of uterine perforation. The occurrence of retained products of conception may be reduced if the abortion is completed either under laparoscopic or ultrasonographic guidance. Broad spectrum antibiotic coverage is recommended for all cases of uterine perforation following abortion because of the high incidence of postoperative fever. Anaemia was the commonest complication (17%), followed by post operative fever (15%) and bowel injury (3%) in another study<sup>(5)</sup>.

There was no mortality in this series. The abortion-related death rate was quoted as 0.2-4.1 per 100,000 procedures<sup>(1)</sup>. Kafriksen et al<sup>(21)</sup> studied a cluster of 4 abortion-related deaths at a single facility, and haemorrhage as a result of perforation was the cause of death in 2 of the 4 patients. For the other 2 deaths,

one was attributed to a prolapsed mitral valve and the other to ventricular fibrillation. Haemorrhage ranked third after complications of anaesthesia and infection as a cause of abortion-related death mortality in the United States. Prompt treatment of abortion complications and community-based surveillance of serious morbidity are recommended to decrease mortality rate.

## CONCLUSION

Uterine perforation is likely to occur when the abortion is performed by medical officers, within 6 months of previous pregnancy, and when the uterus is retroverted. The suction cannula, uterine sound and dilator are implicated in about equal number of cases. The majority of the cases underwent laparotomy and repair of the perforation. As most of the uterine perforations were diagnosed early prior to commencement of suction, no severe visceral injury was encountered.

Injury by instruments during abortions may occur even in the hands of the most experienced gynaecologist. A careful assessment of the uterine size and position, vigilance in the use of the uterine sound and dilators, greater care in the use of suction cannula, and experience in vacuum aspiration will decrease the incidence of uterine perforation during elective abortions. A high degree of suspicion together with early diagnosis and treatment will prevent the potential complications that may arise from uterine perforation.

## REFERENCES

1. Beric B, Kupresanin M, Kapor-Stanulovic N. Accidents and sequelae of medical abortions. *Am J Obstet Gynecol* 1973; 116:813-21.
2. Grimes DA, Schulz KF, Cates W Jr, Tyler CW Jr. Midtrimester abortion by dilation and evacuation; a safe and practical alternative. *N Engl J Med* 1977; 296:1141-5.
3. Cates W Jr, Schulz KF, Grimes DA, Horowitz AJ, Lyon FA, Krovitz FH, et al. Dilation and evacuation procedures and second-trimester abortions: The role of physician skill and hospital setting. *JAMA* 1982; 248:559-63.
4. Grimes DA, Schulz KF, Cates WJ Jr. Prevention of uterine perforation during curettage abortion. *JAMA* 1984; 251:2108-11.
5. Cates W Jr, Grimes DA. Deaths from second trimester abortions by dilation and evacuation: Causes, prevention, facilities. *Obstet Gynecol* 1981; 58:401-8.
6. Beric BM, Kupresanin M. Vacuum aspiration, using pericervical block, for legal abortion as an outpatient procedure up to the 12th week of pregnancy. *Lancet* 1971; ii:619-21.
7. Nathanson BN. Management of uterine perforation suffered as elective abortion. *Am J Obstet Gynecol* 1972; 114:1054-9.
8. Kaali SG, Szigetvari IA, Bartfai GS. The frequency and management of uterine perforations during first-trimester abortions. *Am J Obstet Gynecol* 1989; 161:406-8.
9. Frelman SM, Wulff GJL Jr. Management of uterine perforation following elective abortion. *Obstet Gynecol* 1977; 50:647-50.
10. Mittal S, Misra SL. Uterine perforation following medical termination of pregnancy by vacuum aspiration. *Int J Gynaecol Obstet* 1985; 23:45-50.
11. White MK, Ory HW, Goldenberg LA. A case-control study of uterine perforations documented at laparoscopy. *Am J Obstet Gynecol* 1977; 129:623.
12. Skjeldestad FE, Tuveng J. Cervical dilatation with Lemicel in first trimester therapeutic abortions. *Int J Gynaecol Obstet* 1990; 33:153-7.
13. Inversan T, Skjeldestad FE. Intracervical administration of prostaglandin E<sub>2</sub> prior to vacuum aspiration. A prospective double-blind randomised study. *Int J Gynaecol Obstet* 1985; 23:95-9.
14. Peterson HB, Grimes DA, Cates W Jr, Rubin GL. Comparative risk of death from induced abortion at 12 weeks' gestation performed with local versus general anaesthesia. *Am J Obstet Gynecol* 1981; 141:763-8.
15. Moberg PJ. Uterine perforations in connection with vacuum aspiration in legal abortion. *Int J Gynecol Obstet* 1976; 14:77-80.
16. Lauersen NH, Birnbaum S. Laparoscopy as a diagnostic and therapeutic technique in uterine perforations during first trimester abortions. *Am J Obstet Gynecol* 1973; 117:522-6.
17. Stewart GK, Goldstein P. Medical and surgical complications of therapeutic abortions. *Obstet Gynecol* 1972; 40:539-50.
18. Darney PD, Sweet RL. Routine intraoperative ultrasonography for second trimester abortion reduces incidence of uterine perforation. *J Ultrasound Med* 1989; 8:71-5.
19. Fleischer AC, Burnett LS, Murray MJ, Jones HW. Intraoperative guidance for intrauterine procedures with transrectal sonography. *Radiology* 1990; 176:576-7.
20. Kumar P, Rao P. Laparoscopy as a diagnostic and therapeutic technique in uterine perforation during first trimester abortions. *Asia-Oceania J Obstet Gynaecol* 1988; 14:55-9.
21. Kafriksen ME, Grimes DA, Hogue CJR, Sacks JJ. Cluster of abortion deaths at a single facility. *Obstet Gynecol* 1986; 68:387-9.