

PREGNANCY TERMINATION WITH THE BATELLE HAND PUMP: BARODA EXPERIENCE

by

ROHIT BHATT,* M.D., D.C.H.
SAROJ PACHAURI,** M.D., D.P.H., Ph.D.
L. N. CHAUHAN,*** M.D.

and

ARMIN JAMSHEDJI,† M.A.

Introduction

Although abortion was legalized in India in 1971, inadequate facilities for performing induced abortions have hampered the implementation of the programme, especially in rural areas. To make abortion services widely available, rural centres should be provided with effective equipment that is available at low cost, does not require the use of electricity and is easy to maintain and repair. Keeping in mind these criteria, a hand pump was developed by Batelle in the USA. This study was conducted to evaluate the safety, effectiveness and technical efficiency of the Batelle hand pump for terminating first trimester pregnancies.

Materials and Methods

From August 1979 to April 1978, 200 women underwent termination of preg-

*Professor and Head, Department of Obstetrics and Gynaecology, Baroda Medical College, Baroda

**Research Director, India Fertility Research Programme, Hyderabad

***Research Assistant, Department of Obstetrics & Gynaecology, Baroda Medical College, Baroda

†Research Assistant, India Fertility Research Programme Hyderabad

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nancy with the Batelle hand pump at the Baroda Medical College Hospital, Baroda, India.

Definitions and Criteria

Physically healthy women with pregnancies of 5 to 10 weeks' gestation were included in the study. Gestational age was calculated as the number of completed weeks from the first day of the last normal menstrual period patient to the day of the abortion. The recommended period of follow-up was from 2 to 4 weeks after the procedure. In this study, 93.0 per cent cases returned for follow-up history and examination.

Immediate complications were defined as those occurring from the beginning of the procedure to hospital discharge. Follow-up complications were defined as those occurring between hospital discharge and follow-up contact. Blood loss during the abortion was estimated by the operator from aspirated uterine contents. Blood loss of 100 ml or more was defined as excessive. Procedure time was the time from the insertion to the removal of the speculum and cannula time from the insertion to the last removal of the cannula. Cannula obstruction was defined operationally by the number of times

it was removed from the uterine cavity.

The equipment was evaluated using the following criteria:

1. incidence of complications/complaints,
2. incidence of technical difficulties,
3. procedure and cannula time and
4. frequency of cannula obstruction.

The Abortion Procedure

Half an hour before initiating the procedure, 100 mg of pethidine and 0.6 mg of atropine was administered intramuscularly.

The patient was placed in the dorsal lithotomy position and draped. A pelvic examination was conducted to confirm previous findings. The cervix was dilated upto the required size. Depending on the size of the uterus a 4 to 10 mm cannula was inserted into the uterus while the hand pump was kept precharged. The procedure was continued until the uterus was completely evacuated. A curette check was routinely performed. Prophylactic antibiotics were routinely administered. A detailed description of the Battelle hand pump and its operating mechanism has been reported previously (4).

Results

Sociodemographic Characteristics

The majority (73.0%) of the women in the study group were 20 to 29 years of age (mean age 26.3 years). While 66.0 per cent had 1 or 2 children, a fourth of the group had 3 or more children, and 9.0 per cent were nulliparous (mean parity 2.0). The majority of the women were educated (mean school years 9.5); 66.5 per cent had 10 or more years of school-

ing. Only 11.5 per cent of the women were employed (Table I).

Gestational Age

Pregnancy was terminated at 5 to 6 weeks' gestation in more than half of the cases at 7 to 8 weeks' gestation (34.5%) in one third and at 9 to 10 weeks' gestation in 7.5 per cent cases (Table I). On re-evaluation, 1 of the study cases was found to be non-pregnant.

Complications

Table II lists all the complications and complaints reported during and after the procedure and at follow-up. No serious complications were reported either during or after the procedure. Excessive blood loss was not reported for any cases. At follow-up, curettage was required for 3 (1.5%) subjects who complained of bleeding. Bleeding/spotting not requiring treatment (15.5%) was the most frequently reported postoperative complication at follow-up. One subject who had bleeding with tender fornices received antibiotics.

Concurrent sterilisation was performed for 29 (14.5%) study subjects. However, no complications were reported for any of these cases. Most of the sterilisation procedures were performed with the needlescope.

Difficulties

Difficulties were reported for 12 (6.0%) procedures. In 3 (1.5%) cases, the uterus could not be completely evacuated with the hand pump because of technical difficulties with the equipment and a second procedure was required to terminate the

TABLE I
Sociodemographic Characteristics of 200 Women Undergoing First Trimester Abortion with the Batelle Hand Pump

Sociodemographic Characteristics	Number	Per cent
Age (Years)		
19	6	3.0
20-24	72	36.0
25-29	74	37.0
30-34	40	20.0
35 +	8	4.0
Mean		26.3
Parity		
0	18	9.0
1- 2	132	66.0
3- 4	40	20.0
5- 6	10	5.0
Mean		2.0
Patient's Education (School years)		
0	19	9.5
1- 3	7	3.5
4- 6	15	7.5
7- 9	26	13.0
10-12	89	44.5
13 +	44	22.0
Mean		9.5
Employed		
No	177	88.5
Yes	23	11.5
Gestation (Weeks)		
5- 6	116	58.0
7- 8	69	34.5
9-10	15	7.5

pregnancy—In one case leakage of air between the cannula and the dilated cervical canal prevented complete evacuation; the procedure was completed by curettage. A pregnancy of 7 weeks' gestation the uterus was evacuated using the electrical suction apparatus because there was leakage of air from the cannula adapter. In the third case, the operator required to use a number 7 cannula to terminate a pregnancy of 8 weeks. As a number 7 cannula was not available and since he

could not successfully use the cannula of size 6, electrical suction was employed for evacuating the uterus. In 9 (4.5%) cases despite technical problems, pregnancy was successfully terminated with the hand pump.

The most frequently reported technical difficulties were blockage of cannula (3.5%) and leakage of air (1.5%). In 1 case uterine tissue was aspirated into the shorter plastic tube and in another the push button of the adapter was faulty

TABLE II
Complications/Complaints Reported for 200 Women

Complications/ Complaints	Number	Per cent
Immediate:		
Abdominal pain	16	8.0
Vomiting/nausea	16	3.0
Depression	1	0.5
Vasovagal attack	1	0.5
Chest pain	1	0.5
Backache	1	0.5
Discomfort in abdomen	1	0.5
Early postoperative:		
Bleeding/spotting	31	15.5
Bleeding requiring curettage	3	1.5
Abdominal pain	9	4.5
Tender fornix	1	0.5
Leucorrhoea	1	0.5

and was consequently changed (Table III).

TABLE III
Technical Difficulties Reported for 200 Women

Technical Difficulty	Number	Per cent
Blockage of cannula	7	3.5
Leakage of air	3	1.5
Material aspirated in shorter plastic tube	1	0.5
Push button of adapter faulty	1	0.5
TOTAL	12	6.0

TABLE IV
Number of Times Cannula Inserted by Gestation for 200 Women

No. of Times Cannula Inserted	Gestation (Weeks)					
	5 - 6		7 - 8		9 - 10	
	N = 116		N = 69		N = 15	
	No.	%	No.	%	No.	%
1	49	42.2	14	20.3	1	6.7
2	56	48.3	34	49.3	5	33.3
3	10	8.6	16	23.2	4	26.7
4 +	1	0.9	5	7.2	5	33.3
Mean	2.1		2.5		3.4	

Cannula Obstruction

Cannula obstruction was more frequent at higher gestations. The cannula had to be reinserted for over one half of the cases at 5 to 6 weeks' and for over three fourths of the cases at 7 to 10 weeks' gestation (Table IV).

The mean number of times the cannula was inserted increased with increasing gestation (Table IV and Fig. 1), and with

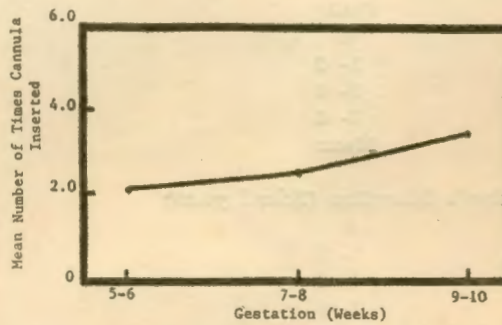


Fig 1
MEAN NUMBER OF TIMES CANNULA INSERTED BY GESTATION FOR 200 WOMEN UNDERGOING FIRST TRIMESTER ABORTION WITH THE BATELLE HAND PUMP AT THE BARODA MEDICAL COLLEGE HOSPITAL, BARODA, AUGUST 1976 TO APRIL 1978

increasing volume of the aspirate (Table V and Fig. 2). The cannula was reinserted in 16.9 per cent cases when the volume of aspirate was less than 15 ml. However, when the volume of aspirate was more than 15 ml, the cannula had to be reinserted in over 80 per cent cases (Table V).

TABLE V
Number of Times Cannula Inserted by Volume of Aspirate for 200 Women

Volume of Aspirate (ml)	Number of Times Cannula Inserted							
	1		2		3		4+	
	No.	%	No.	%	No.	%	No.	%
< 9	6	9.3	4	4.2	0	0.0	0	0.0
10-14	22	34.4	15	15.8	4	13.3	0	0.0
15-19	13	20.3	25	26.3	5	16.7	0	0.0
20-24	13	20.3	29	30.5	4	13.3	3	27.3
25 +	10	15.6	22	23.2	17	56.7	8	72.7
Mean	17.6		20.8		22.7		32.0	

Procedure Time and Hospitalisation

The majority (77.5%) of the procedures were completed within 4 to 7 minutes. Mean procedure time increases

with gestational age (Table VI and Fig. 3). Cannula time was 1 to 3 minutes for 80 per cent procedures. Mean cannula time also increased with gestational age (Table VII and Fig. 3).

TABLE VI
Procedure Time by Gestation for 200 Women

Procedure Time (Minutes)	Weeks' Gestation					
	5-6		7-8		9-10	
	No.	%	No.	%	No.	%
2-3	23	19.8	2	2.9	0	0.0
4-5	47	40.5	21	30.4	0	0.0
6-7	40	34.5	34	49.3	13	86.7
8 +	6	5.2	12	17.4	2	13.3
Mean		5.5		6.5		7.3

TABLE VII
Cannula Time by Gestation for 200 Women Undergoing First Trimester Abortion with the Batelle Hand Pump at the Baroda Medical College Hospital, Baroda, August 1976 to April 1978

Cannula Time (Minutes)	Gestation (Weeks)					
	5-6		7-8		9-10	
	No.	%	No.	%	No.	%
< 1.0	19	16.4	5	7.2	0	0.0
1.1-2.0	58	50.0	26	37.7	3	20.0
2.1-3.0	29	25.0	17	24.6	3	20.0
3.1-4.0	5	4.3	13	18.8	4	26.7
4.1-5.0	4	3.4	6	8.7	3	20.0
5.1 +	1	0.9	2	2.9	2	13.3
Mean		1.9		2.5		3.4

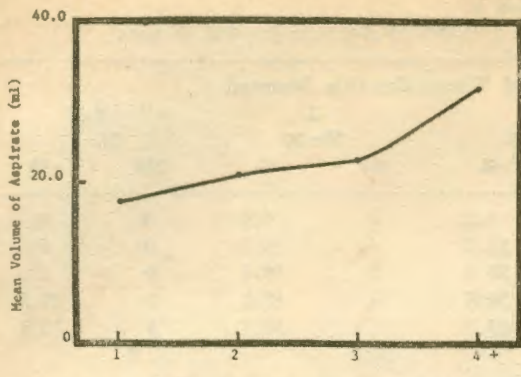


Fig 2
NUMBER OF TIMES CANNULA INSERTED BY MEAN VOLUME OF ASPIRATE FOR 200 WOMEN UNDERGOING FIRST TRIMESTER ABORTION WITH THE BATELLE HAND PUMP AT THE BARODA MEDICAL COLLEGE, BARODA, AUGUST 1976 TO APRIL 1978

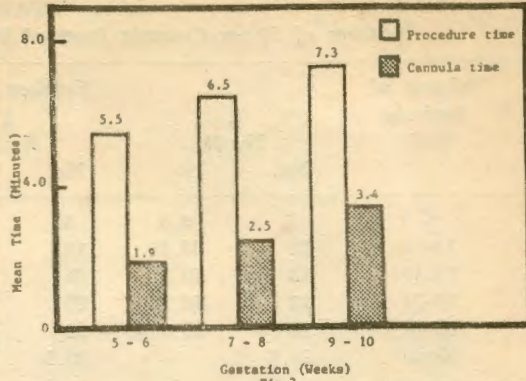


Fig 3
GESTATION BY PROCEDURE AND CANNULA TIME FOR 200 WOMEN UNDERGOING FIRST TRIMESTER ABORTION WITH THE BATELLE HAND PUMP AT THE BARODA MEDICAL COLLEGE HOSPITAL, BARODA, AUGUST 1976 TO APRIL 1978

All procedures were performed on an outpatient basis. Only women who underwent concurrent sterilisation were hospitalised.

Fertility Control Acceptance

The majority (79.0%) of the women in the study group did not use any method of fertility control three months before abortion. After the abortion, however,

86.5 per cent accepted a method. In more than half the cases, IUDs (56.0%) were inserted immediately after abortion. Concurrent sterilisation was performed in 14.5 per cent cases. In 4.0 per cent cases the husband underwent sterilisation. Oral contraceptives were accepted by 7.5 and other contraceptives by 4.5 per cent of the study cases (Fig. 4).

Discussion

Suction evacuation with an electric pump is documented to be safe and effective.

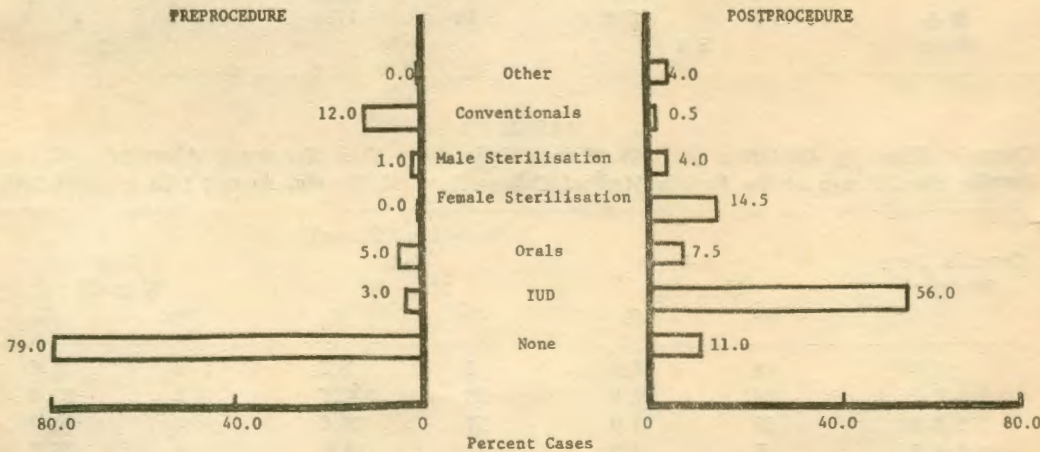


Fig 4

PRE AND POSTPROCEDURE FERTILITY CONTROL ACCEPTANCE BY 200 WOMEN UNDERGOING FIRST TRIMESTER ABORTION WITH THE BATELLE HAND PUMP AT THE BARODA MEDICAL COLLEGE HOSPITAL, BARODA, AUGUST 1976 TO APRIL 1978

tive (Andolsek *et al* 1976; Moghadam *et al* 1976; Mullick *et al* 1977). However, equipment requiring the use of electricity obviously has limited application for rural areas in India. Alternative methods such as the hand pump and the foot-pump are, therefore, being developed. This study shows that first trimester pregnancies can be safely terminated with the Batelle hand pump. The complication rates with this equipment were lower than rates reported with the use of the electric pump (Andolsek 1976; Moghadam *et al* 1976). No serious complications were reported. In 3 cases, however, pregnancy could not be successfully terminated with the hand pump and a second method was required. To improve the present prototype equipment it should be modified to allow more cannula rotation without leakage of air, the adapter system should be modified. Provision of larger size cannula will minimize the problem of cannula blockage.

This and other studies (Mehta and Lulla 1978; Mullick *et al* 1977) indicate that Batelle's design of the hand pump has considerable potential for rural application. In order to make this equipment widely available it is recommended that this design be replicated locally with suggested improvements and the hand pump should be locally manufactured.

Summary

To make abortion services widely available, rural centres should be provided with effective equipment that is available at low cost, does not require the use of electricity and is easy to maintain and repair. This study was conducted to evaluate the safety, effectiveness and technical efficiency of the Batelle hand

pump for terminating first trimester pregnancies in 200 cases at the Baroda Medical College Hospital.

The reported complication rate was low, no serious complications were reported. Technical difficulties were reported for 6.0 per cent procedures; a second procedure was required to completely evacuate the uterus in 3 (1.5%) cases. In 9 (4.5%) cases despite technical problems, pregnancy was successfully terminated with the hand pump. Cannula blockage was the most frequently reported technical difficulty. The mean number of times the cannula was inserted increased with increasing gestation and increasing volume of the aspirate. The majority (77.5%) of the procedures were completed within 4 to 7 minutes. Mean procedure and cannula time increased with increasing gestation. Fertility control acceptance increased from 21.0 per cent before to 86.5 per cent after abortion.

The results of this study indicate that first trimester pregnancies can be safely terminated with the Battelle hand pump. To make this equipment widely available in rural areas, the authors recommend that this design be replicated locally with suggested improvements and the hand pump should be locally manufactured.

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