

Case no.	Type of arrhythmia	Period (week)	Correspondence	Antiarrhythmic drug	Dose (mg)
2	PVC	30	Antiarrhythmic drug started	Metoprolol	30
3	NSVT	30	Antiarrhythmic drug started	Metoprolol	60
4	NSVT	13	Antiarrhythmic drug started	Propranolol	60
5	NSVT	32	Antiarrhythmic drug started	Metoprolol	40
7	PVC, PAC	32	Antiarrhythmic drug started	Metoprolol	40
8	PVC	12	Antiarrhythmic drug started	Bisoprolol	2.5
10	PVC	13	Antiarrhythmic drug started	Propranolol	60
11	NSVT	32	Antiarrhythmic drug started	Atenolol	25
12	NSVT	13	Antiarrhythmic drug increased	Metoprolol	40→60
12	NSVT	29	CS	—	—
17	PVC	31	Antiarrhythmic drug started	Propranolol	20
25	VT	24	Antiarrhythmic drug started	Carvedilol	10
27	PVC	Postpartum	Antiarrhythmic drug increased	Propranolol	60→80

NSVT, nonsustained ventricular tachycardia (VT); PAC, premature atrial contraction; PVC, premature ventricular contraction. Other abbreviations as in Tables 1,2.

ing 13 events (76%) related to arrhythmia (Table 4). Arrhythmia was the most common cardiovascular event. The cardiovascular events occurred in the early stage of pregnancy at approximately 30 gestational weeks, or postpartum (Figure). The events related to arrhythmia mainly occurred in the early stage of pregnancy or at approximately 30 gestational weeks. A total of 4 pregnancies were terminated because of a cardiovascular event (cases 8, 10, 11, 12). In case 8, the pregnancy was terminated at 31 gestational weeks because the mother was developing pulmonary hypertension and the PG of LVOTO had increased rapidly (peak PG 57 mmHg). Postpartum, the PG returned to the pre-pregnancy value. In cases 10 and 11, pregnancy was terminated at 27 and 36 gestational weeks, respectively, because in both cases there was an increased PG of LVOTO resulting from increased preload, and the mothers developed lung edema. After termination, the lung edema improved in both cases. In case 12, the pregnancy was terminated because nonsustained ventricular tachycardia (NSVT) could not be controlled with drug therapy. Thus, 3 of the 4 pregnancies (75%) were terminated because of a cardiovascular event in the mother who had started or increased her dose of antiarrhythmic drugs.

Premature delivery occurred in 7 of the 27 pregnancies (26%) because of cardiovascular events in 4 cases (57%) and obstetric complications (threatened premature labor) in 3 cases.

When comparing the pregnancies complicated by cardiovascular events with those unaffected by such events, the NYHA class before pregnancy, and echocardiographic parameters (LVEF, LADs, MR, LVOTO, maximum wall thickness) could not be analyzed because of the small number of positive findings. HOCM or family history of HCM were not risk factors ($P=0.22$, $P=0.90$). In the current study, medication in the pre-pregnancy period and CARPREG or ZAHARA score ≥ 1 or more were identified as risk factors of cardiac events during pregnancy or postpartum (Table 5).

Discussion

A cardiovascular event related to HCM occurred in 13 of 27 pregnancies. Cardiovascular events showed 3 peak times of occurrence: early pregnancy, approximately 30 gestational weeks, and postpartum. In previous similar studies,³⁻⁸ women who were symptomatic before pregnancy and who had a family history were at risk of cardiovascular events during their

	Cardiovascular events	P value
HCM		
No	8/20 (40%)	NS
Yes	5/7 (71%)	
D-HCM		
No	13/27 (48%)	NS
Yes	0/0 (0%)	
Medication (pre-pregnancy)		
No	5/18 (28%)	<0.05
Yes	8/9 (88%)	
NYHA class (pre-pregnancy)		
1	12/26 (46%)	NS
≥ 2	1/1 (100%)	
LVEF <50%		
No	13/27 (48%)	NS
Yes	0/0 (0%)	
Family history		
No	9/19 (33%)	NS
Yes	4/8 (50%)	
LADs >50 mm		
No	12/26 (46%)	NS
Yes	1/1 (100%)	
MR \geq moderate		
No	12/26 (46%)	NS
Yes	1/1 (100%)	
LVOTO >50 mmHg		
No	12/26 (46%)	NS
Yes	1/1 (100%)	
Maximum wall thickness >30 mm		
No	12/26 (46%)	NS
Yes	1/1 (100%)	
High CARPREG score		
0	6/17 (35%)	<0.05
≥ 1	7/10 (70%)	
High ZAHARA score		
0	4/15 (26%)	<0.05
≥ 1	9/12 (75%)	

NS, not significant. Other abbreviations as in Table 1.

pregnancies. Our new findings are that risk factors of cardiovascular events were medication before pregnancy and higher CARPREG or ZAHARA score.

The frequency of cardiovascular events (48%) is similar to the 28–73% reported in previous studies.^{3–9} Collectively the findings show there is a high frequency of cardiovascular events in pregnancy for women with HCM. In the present study, 13 of the 18 events were related to arrhythmia, indicating that many of the cardiovascular events in pregnancy with HCM involve arrhythmia. Mostly, it was ventricular arrhythmias, including premature ventricular contraction and NSVT, and in some cases they were not controllable by medication, which is unusual. These findings indicate the importance of recognizing arrhythmia as a probable cardiovascular event in a pregnant woman with HCM.

Cardiovascular events occurred most frequently at approximately 30 gestational weeks. The increase in the circulating blood volume at 32 gestational weeks reaches 40–45% of the nonpregnant level, and it is notable that the most frequent period of cardiovascular events coincided approximately with the period of peak circulating blood volume during pregnancy. In 3 of the 4 pregnancies terminated because of a cardiovascular event, the event occurred during this period, which suggests that such cases require strict management and medication in the early stage of pregnancy.

Medication before pregnancy and higher CARPREG or ZAHARA score were risk factors for experiencing a cardiovascular event during pregnancy. However, further accumulation of cases and a study of multiple factors are required. These additional factors should include the general condition of the HCM patient, which appeared to influence the outcome in this study, and the observations from previous studies, which include an excellent perinatal prognosis in patients who are asymptomatic before pregnancy,⁵ family history,⁸ the apparent lack of influence of pregnancy on the natural course of HCM, and the tendency for a good prognosis when no symptoms are present before pregnancy.⁷ Consideration of the timing of cardiovascular events may also be included in this analysis, given our finding of a high frequency of cardiovascular events in the early stage of pregnancy, at approximately 30 gestational weeks, and postpartum. Medication in the pre-pregnancy period, and CARPREG or ZAHARA score ≥ 1 were identified as risk factors of cardiac events during pregnancy or postpartum. However, this study was a retrospective analysis with the limita-

tions of a small number of patients and the rarity of the condition.

Conclusions

If a pregnant woman with HCM has such factors as medication in the pre-pregnancy period or CARPREG or ZAHARA score ≥ 1 , careful observation for cardiovascular events is required, especially at approximately 12 and 30 weeks' gestation and also postpartum.

References

1. Miura K, Nakagawa H, Morikawa Y, Nishikawa T, Yamamoto E, Ohki H, et al. Epidemiology of idiopathic cardiomyopathy in Japan: Results from a nationwide survey. *Heart* 2002; **87**: 126–130.
2. Matsumori A, Furukawa Y, Hasegawa K, Sato Y, Nakagawa H, Morikawa Y, et al. Epidemiology and clinical characteristics of cardiomyopathies in Japan: Results from nationwide surveys. *Circ J* 2002; **66**: 323–336.
3. Turner GM, Oakley CM, Dixon HG. Management of pregnancy complicated by hypertrophic obstructive cardiomyopathy. *BMJ* 1968; **4**: 281–284.
4. Oakley GD, McGarry K, Limb DG, Oakley CM. Management of pregnancy in patients with hypertrophic cardiomyopathy. *BMJ* 1979; **1**: 1749–1750.
5. Autore C, Conte MR, Piccininno M, Bernabò P, Bonfiglio G, Bruzzi P, et al. Risk associated with pregnancy in hypertrophic cardiomyopathy. *J Am Coll Cardiol* 2002; **40**: 1864–1869.
6. Avila WS, Rossi EG, Ramires JA, Grinberg M, Bortolotto MR, Zugaib M, et al. Pregnancy in patients with heart disease: Experience with 1,000 cases. *Clin Cardiol* 2003; **26**: 135–142.
7. Thaman R, Varnava A, Hamid MS, Firoozi S, Sachdev B, Condon M, et al. Pregnancy-related complications in women with hypertrophic cardiomyopathy. *Heart* 2003; **89**: 752–756.
8. Avila WS, Amaral FM, Ramires JA, Rossi EG, Grinberg M, Bortolotto MR, et al. Influence of pregnancy on clinical course and fetal outcome of women with hypertrophic cardiomyopathy. *Arq Bras Cardiol* 2007; **88**: 480–485.
9. Siu SC, Sermer M, Colman JM, Alvarez AN, Mercier LA, Morton BC, et al. Prospective multicenter study of pregnancy outcomes in women with heart disease. *Circulation* 2001; **104**: 515–521.
10. Katsuragi S. Maternal outcome in pregnancy complicated with pulmonary arterial hypertension. *Circ J* 2012; **76**: 2249–2254.
11. Kamiya CA. Outcome of pregnancy and effects on the right heart in women with repaired tetralogy of Fallot. *Circ J* 2012; **76**: 957–963.
12. Siu SC, Sermer M, Colman JM. Prospective multicenter study of pregnancy outcomes in women with heart disease. *Circulation* 2001; **104**: 515–521.
13. Drenthen W, Boersma E, Balci A. Predictors of pregnancy complications in women with congenital heart disease. *Eur Heart J* 2010; **31**: 2124–2132.

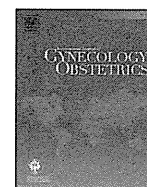


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CLINICAL ARTICLE

Safety of induced abortions at less than 12 weeks of pregnancy in Japan

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ABSTRACT

Objective: To assess the safety of various methods of induced abortion when used before 12 weeks of pregnancy in Japan. **Methods:** A retrospective study was undertaken of induced abortions conducted between January 1 and December 31, 2012. Questionnaires were sent to 4154 institutions that employed doctors who were licensed to conduct induced abortions. Information was obtained about the numbers of induced abortions performed before 12 weeks, methods, complications, and routine management. **Results:** Completed questionnaires from 2434 institutions showed that 100 851 induced abortions had been performed. Vacuum aspiration (VA) was used in 20 458 (20.3%) abortions, VA with sharp curettage in 47 148 (46.8%), dilatation and curettage (D&C) in 32 958 (32.7%), and medical abortion in 287 (0.3%). Overall, 358 complications were reported (355.0 per 100 000 procedures). The rate of complications was significantly higher after D&C than after VA and after VA with sharp curettage ($P < 0.001$ for both). However, incomplete abortion requiring repeat procedures was the only complication that was significantly associated with D&C ($P < 0.001$). **Conclusion:** D&C can be safely used for induced abortion before 12 weeks of pregnancy, but changing from D&C to VA could reduce incomplete abortions and improve the safety of induced abortions before 12 weeks of pregnancy in Japan.

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1. Introduction

After evaluation of several proposed methods for induced abortion during the first trimester, WHO has recommended the adoption of vacuum aspiration (VA) or medical methods using mifepristone and misoprostol to ensure procedures are both safe and effective [1,2]. The organization also stated that dilatation and curettage (D&C) should be replaced by VA to improve safety and quality of care for women [2]. The rationale for this guidance was based on previous studies in which D&C was found to be less safe [3], substantially slower, and associated with more blood loss [4] than was VA. Furthermore, rates of major complications are higher with D&C than VA [5].

The potential risks of D&C have been known since the 1970s [3–5]. Nevertheless, some support exists for the clinical acceptability of this procedure. Kulier et al. [6] conducted a systematic review of randomized controlled trials of different surgical methods for induced abortion during the first trimester and concluded that the incidences of complications were not markedly different between D&C and VA. The only difference observed between these two methods was the operation time, which was lower for VA than D&C. A study conducted by Niinimäki et al. [7] analyzed 42 619 induced first trimester abortions

in Finland, and showed that medical abortions were more likely to be associated with bleeding and re-evacuation than were surgical methods of induced abortion, including VA and D&C. Although surgical abortions led to injury more often than did medical abortions, the overall incidence of such injuries was rare [7]. Consequently, Niinimäki et al. concluded that both VA and D&C could be considered generally safe and clinically acceptable methods for induced abortion.

In the USA, 80% of induced abortions were performed by surgical methods in 2010 [8]; furthermore, most of the procedures since 1995 have involved VA [3]. In England and Wales in 2012, sharp curettage was no longer used, although 50% of abortions were performed by surgical methods [9]. However, D&C still remains one of the most frequently used procedures for induced abortion in Japan [10], with medical abortions using mifepristone or misoprostol not yet legally accepted. The aim of the present study was, therefore, to elucidate the safety of various methods of induced abortion used before 12 weeks of pregnancy in Japan.

2. Materials and methods

A retrospective study was undertaken of induced abortions performed before 12 weeks of pregnancy between January 1 and December 31, 2012. The Japan Association of Obstetricians and Gynecologists provided a list of hospitals that employed doctors licensed to perform induced abortions, and questionnaires were mailed on September 5, 2013, to the Departments of Obstetrics and Gynecology of 4154

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Japanese institutions (1171 hospitals and 2983 clinics). Managers of the departments were asked to complete the questionnaire. Completion and return of the study questionnaire was considered as consent to participate in the present study. Approval was obtained from the ethics committees of the coordinating center (Tama Nagayama Hospital, Nippon Medical School, Tokyo) and the Japan Association of Obstetricians and Gynecologists. The present study conformed to the principles of the Declaration of Helsinki.

The questionnaire obtained information about the number of induced abortions performed before 12 weeks of pregnancy, methods used, complications, and routine management approaches before and during the procedure. Complications were subdivided into uterine perforation, cervical injury, gross bleeding, pelvic infection requiring hospital admission, thromboembolism, anaphylaxis, incomplete abortion requiring repeat procedures, and other types of complication. Routine management approaches included preoperative examination, cervical preparation, monitoring and treatment during the procedure, and use of anesthetics. Responses were confidential and data that might reveal the identity of the patients were not requested.

Data were analyzed using SPSS version 17.0 (SPSS Inc, Chicago, IL, USA). Categorical variables were evaluated using χ^2 or Fisher exact tests with Bonferroni correction. $P < 0.05$ was considered statistically significant.

3. Results

Completed questionnaires were received from 2434 (58.6%) of the 4154 institutions, including 738 (63.0%) of the 1171 hospitals and 1696 (56.9%) of the 2983 clinics. A total of 100 851 induced abortions were performed before 12 weeks of pregnancy, of which 15 946 (15.8%) were performed in hospitals and 84 905 (84.2%) in clinics. Induced abortions had been performed at 1963 institutions, of which 543 (27.7%) were hospitals and 1420 (72.3%) clinics.

The most frequently used method to induce abortion was VA with sharp curettage, whereas medical methods were used rarely (Table 1). Blood cell count, blood group typing, and screening for infection were the most frequently performed preoperative tests (Table 2). Cervical preparation using an osmotic dilator was conducted at 1288 institutions (65.6%). Cervical preparation was performed at 445 (82.0%) hospitals and 843 (59.4%) clinics. Intravenous infusion, oxygen saturation monitoring, and automatic blood pressure monitoring were used during procedures at many institutions (Table 2). The most frequently used anesthetics were thiamylal or thiopental (Table 2).

Overall, 358 (0.4%) of the induced abortions had complications, equivalent to a total complication rate of 355.0 per 100 000 induced abortions. Among the 358 complications, 295 (82.4%) were incomplete abortions, 19 (5.3%) uterine perforations, 17 (4.7%) gross bleeding, 12 (3.4%) anaphylaxis, 3 (0.8%) pelvic infections requiring hospitalization, 2 (0.6%) cervical injuries, and 10 (2.8%) other (Table 3). No instances of thromboembolism or maternal death were recorded.

Rates of complications, and specifically incomplete abortions, were significantly higher after D&C than after VA and after VA with sharp curettage ($P < 0.001$ for all) (Table 3). The rates of complications and incomplete abortions were also higher for VA with sharp curettage than for VA alone ($P < 0.001$ for both) (Table 3). The rates of uterine perforation and gross bleeding were not significantly different among

Table 2

Routine management of women undergoing induced abortion before 12 weeks of pregnancy within the 1963 participating institutions.

Management approach	No. (%)
Preoperative examination	
Blood cell count	889 (45.3)
Blood group typing	839 (42.7)
Screening for infection	733 (37.3)
Laboratory test ^a	366 (18.6)
Electrocardiograph	300 (15.3)
Blood coagulation test	192 (9.8)
Irregular antibody screening	125 (6.4)
Chest radiograph	35 (1.8)
Cervical preparation	
Yes	1288 (65.6)
No	675 (34.4)
Monitoring and treatments during the procedure	
Intravenous infusion	1770 (90.2)
Oxygen saturation monitoring	1615 (82.3)
Automatic blood pressure monitoring	1508 (76.8)
Electrocardiogram monitoring	1110 (56.5)
Ultrasound-guided procedure	777 (39.6)
Use of anesthetic	
Thiamylal or thiopental	937 (47.7)
Pentazocine	882 (44.9)
Diazepam	715 (36.4)
Ketamine	538 (27.4)
Propofol	420 (21.4)

^a Measurements of aspartate transaminase, alanine transaminase, lactate dehydrogenase, blood urea nitrogen, and creatinine.

the three surgical methods (Table 3). The rates of uterine perforation and gross bleeding were significantly lower after VA (1 in 20 458 and 2 in 20 458, respectively) than after medical abortion (0 in 287 for both; $P < 0.001$ and $P = 0.004$, respectively).

Cervical preparation was associated with increased rates of total complications and incomplete abortions (Table 4). By contrast, the use of ultrasonography during surgical abortion did not influence the rates of complications (Table 4).

4. Discussion

The present study found that sharp curettage (either as D&C or with VA) was used in 79.5% of induced abortions performed before 12 weeks of pregnancy in Japan. Nevertheless, the rates of complications were increased when this method was used, either as part of D&C or with VA. The most frequent complication overall was incomplete abortion. By contrast, other complications, including uterine perforation and gross bleeding, were rarely reported and no maternal deaths occurred.

A report published in 2007 by the Society of Family Planning [11] showed that the incidences of major complications, uterine perforation, and cervical injury associated with surgical abortion performed during the first trimester in the USA were less than 1000, 10–400, and 10–1000 per 100 000 induced abortions, respectively. The Royal College of Obstetricians and Gynaecologists in the UK investigated complications following either medical or surgical abortion during the first trimester [5]. For medical abortion, rates of uterine rupture and severe bleeding requiring transfusion were both less than 100 per 100 000 induced abortions. For surgical abortion, the rates of uterine perforation and cervical injury were 100–400 and less than 1000 per 100 000 induced abortions, respectively. Failure to end pregnancy was the most frequent complication reported overall (1000 per 100 000 induced abortions) [5,7,9,12]. Consequently, the findings of the present study regarding rates of complications were similar to previous reports.

Nonetheless, the observed rates of total complications and incomplete abortions in the present study differed according to the method of induced abortion used. The use of VA alone seemed to be associated with the lowest incidence of incomplete abortion. The reason why this method was advantageous is unclear. It is possible that clinicians

Table 1

Methods used for induced abortion before 12 weeks of pregnancy ($n = 100 851$).

Method	No. (%)
Vacuum aspiration	20 458 (20.3)
Vacuum aspiration with sharp curettage	47 148 (46.8)
Dilatation and curettage	32 958 (32.7)
Medical abortion	287 (0.3)

Table 3
Complications associated with each method of induced abortion.

Method	Number of procedures in which method used	Total complications			Incomplete abortion			Uterine perforation			Gross bleeding		
		No. (%)	Rate ^a	P value ^b	No. (%)	Rate ^a	P value ^b	No. (%)	Rate ^a	P value ^b	No. (%)	Rate ^a	P value ^b
Vacuum aspiration	20 458	23 (0.1)	112.4	NA	20 (0.1)	97.8	NA	1 (<0.1)	4.9	NA	2 (<0.1)	9.8	NA
Vacuum aspiration with sharp curettage	47 148	139 (0.3)	294.8	<0.001 ^c	107 (0.2)	226.9	<0.001 ^c	6 (<0.1)	12.7	0.611 ^c	9 (<0.1)	19.1	0.586 ^c
Dilatation and curettage	32 958	194 (0.6)	588.6	<0.001 ^c	166 (0.5)	503.7	<0.001 ^c	12 (<0.1)	36.4	0.047 ^c	6 (<0.1)	18.2	0.682 ^c
Medical abortion	287	2 (0.7)	696.9	0.048 ^c	2 (0.7)	696.9	0.029 ^c	0	0.0	<0.001 ^c	0	0.0	0.004 ^c
				0.482 ^d			0.299 ^d			0.015 ^d			0.055 ^d
				0.882 ^e			0.967 ^e			0.216 ^e			0.048 ^e
Total	100 851	358 (0.4)	355.0	NA	295 (0.3)	292.5	NA	19 (<0.1)	18.8	NA	17 (<0.1)	16.9	NA

Abbreviation: NA, not applicable.

^a Per 100 000 induced abortions performed by that method.^b For comparisons of rates.^c Versus vacuum aspiration.^d Versus vacuum aspiration with sharp curettage.^e Versus dilatation and curettage.

might tend to use sharp curettage in combination with VA for the management of technically difficult abortions, in which complications are likely irrespective of the use of sharp curettage.

Cervical preparation has been recommended when using surgical methods [5] or for high-risk patients with cervical injury and uterine perforation [2]. Both mechanical and medical cervical dilations can shorten induced abortion procedures; however, the optimum gestational period at which cervical preparation should be performed has not yet been identified [13]. In the present study, routine cervical preparation was performed in 65.6% of all institutions. Nevertheless, use of this treatment was unexpectedly related to a high incidence of incomplete abortion. This result could reflect the fact that cervical preparation was more frequently performed in hospitals than in clinics, and women referred to hospitals from clinics could be at increased risk of incomplete abortion.

Ultrasound-guided procedures have been recommended for D&C performed after 14 weeks of pregnancy [5], but the effect of this approach during the first trimester is unclear [2]. In the present study, the routine use of ultrasonography during induced abortions conducted before 12 weeks of pregnancy did not decrease the rates of complications. Although ultrasound-guided procedures are not routinely required during the first trimester in Japan, they could be effective for some patients, such as women with multiple uterine myoma, a uterine anomaly, or a history of uterine surgery.

The use of anesthesia during surgical abortions remains controversial. Although no difference was reported in the incidences of complications between general and local anesthesia in one study [14], it has been suggested that paracervical block [2] and non-steroidal anti-inflammatory drugs [5] should be used instead of general anesthesia during routine procedures because of quick recovery and low cost. In

the present study, general anesthesia was widely used for first trimester abortions. However, intravenous infusion, electrocardiogram monitoring, automatic blood pressure monitoring, and oxygen saturation monitoring were also frequently used during surgical methods performed under general anesthesia. These treatments and monitoring methods are postulated to have effectively prevented adverse effects related to general anesthesia.

The main limitations of the present study were the retrospective design and the fact that the data were collected using questionnaires, which were completed by only 58.6% of the institutions that were invited to participate. Furthermore, the effects of cervical dilatation and ultrasound-guided procedures on prevention of complications were not analyzed for each patient because individual medical records were not obtained.

Furthermore, the legal and social context of induced abortion differs among countries. Mifepristone and misoprostol are not currently available for induced abortion in Japan; however, surgical procedures can be provided with general anesthesia and sufficient monitoring of vital signs. A total of 287 medical abortions were reported in the present study, but the medication used was not asked. In regions where medical abortion using mifepristone and misoprostol is available, it is possible that this method has advantages over surgical abortion in terms of accessibility, safety, and cost-effectiveness.

In conclusion, although D&C was used in almost one-third of induced abortions conducted at less than 12 weeks of gestation in Japan, the incidence of total complications was comparable to that in other high-income countries that predominantly use VA and medical methods. However, use of VA rather than D&C could decrease the incidence of incomplete abortions, the need for repeat procedures, and further improve the safety of early abortions.

Table 4
Association between complications of induced abortion and routine management.^a

Management approach	Institutions (n = 1963)	Induced abortions (n = 100 851)	Total complications (n = 358)			Incomplete abortion (n = 295)			Uterine perforation (n = 19)			Gross bleeding (n = 17)		
			No. (%)	Rate ^b	P value ^c	No.	Rate ^b	P value ^c	No. (%)	Rate ^b	P value ^c	No. (%)	Rate ^b	P value ^c
Cervical preparation														
Yes	1288 (65.6)	58 321 (57.8)	238 (66.5)	408.1	<0.001	189 (64.1)	324.1	0.032	15 (78.9)	25.7	0.103	13 (76.5)	22.3	0.19
No	675 (34.4)	42 530 (42.2)	120 (33.5)	282.2		106 (35.9)	249.2		4 (21.1)	9.4		4 (23.5)	9.4	
Ultrasound-guided procedure														
Yes	777 (39.6)	42 930 (42.6)	140 (39.1)	326.1	0.185	116 (39.3)	270.2	0.246	7 (36.8)	16.3	0.614	8 (47.1)	18.6	0.90
No	1186 (60.4)	57 921 (57.4)	218 (60.9)	376.4		179 (60.7)	309.0		12 (63.2)	20.7		9 (52.9)	15.5	

^a Values given as number (percentage) unless indicated otherwise.^b Per 100 000 induced abortions with that management approach.^c For comparisons of rates.

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Conflict of interest

The authors have no conflicts of interest.

References

- [1] World Health Organization. Safe abortion: technical and policy guidance for health systems. <http://whqlibdoc.who.int/publications/2003/9241590343.pdf>. Published 2003. Accessed November 24, 2014.
- [2] World Health Organization. Safe abortion: technical and policy guidance for health systems. Second edition. http://apps.who.int/iris/bitstream/10665/70914/1/9789241548434_eng.pdf?ua=1. Published 2012. Accessed November 24, 2014.
- [3] Cates W, Grimes DA, Schulz KF. Abortion surveillance at CDC: creating public health light out of political heat. *Am J Prev Med* 2000;19(1 Suppl.):12–7.
- [4] Lean TH, Vengadasalam D, Pachauri S, Miller ER. A comparison of D & C and vacuum aspiration for performing first trimester abortion. *Int J Gynecol Obstet* 1976;14(6):481–6.
- [5] Royal College of Obstetricians and Gynaecologists. The Care of Women Requesting Induced Abortion: Evidence-based Clinical Guideline Number 7. https://www.rcog.org.uk/globalassets/documents/guidelines/abortion-guideline_web_1.pdf. Published September 2004. Accessed November 24, 2014.
- [6] Kulier R, Fekih A, Hofmeyr CJ, Campana A. Surgical methods for first trimester termination of pregnancy. *Cochrane Database Syst Rev* 2001;4:CD002900.
- [7] Niinimäki M, Pouta A, Bloigu A, Gissler M, Hemminki E, Suhonen S, et al. Immediate complications after medical compared with surgical termination of pregnancy. *Obstet Gynecol* 2009;114(4):795–804.
- [8] Pazol K, Creanga AA, Burley KD, Hayes B, Jamieson DJ. Centers for Disease Control and Prevention (CDC). Abortion surveillance - United States, 2010. *MMWR Surveill Summ* 2013;62(8):1–44.
- [9] Abortion Statistics, Department of Health. Abortion Statistics, England and Wales: 2012. Summary information from the abortion notification forms returned to the Chief Medical Officers of England and Wales. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/307650/Abortion_statistics__England_and_Wales.pdf. Published April 2014. Accessed November 24, 2014.
- [10] Adachi T. Prevention of repeated induced abortions in Japan: survey of induced abortions in Japan. Annual report of research on children and families (in Japanese). Tokyo: Japanese Ministry of Health, Labour and Welfare; 2008.
- [11] Allen RH, Goldberg AB. Board of Society of Family Planning. Cervical dilation before first-trimester surgical abortion (<14 weeks' gestation). SFP Guideline 20071. *Contraception* 2007;76(2):139–56.
- [12] UK Department of Health. Abortion statistics, England and Wales: 2009. *Statistical Bulletin* 2010/1. London: Department of Health; 2010.
- [13] Kapp N, Lohr PA, Ngo TD, Hayes JL. Cervical preparation for first trimester surgical abortion. *Cochrane Database Syst Rev* 2010;2:CD007207.
- [14] Peterson HB, Grimes DA, Cates Jr W, Rubin GL. Comparative risk of death from induced abortion at less than or equal to 12 weeks' gestation performed with local versus general anesthesia. *Am J Obstet Gynecol* 1981;141(7):763–8.

中絶の地域格差

人工妊娠中絶、妊産婦死亡の地域格差に関する研究

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人工妊娠中絶と社会的要因の関係

厚生労働科学研究助成金によって行われた研究の発表がある。平成26年度厚生労働科学研究・成育疾患克服等次世代育成支援研究事業「子どもが健やかに育つみらいのために」が、3月11日行われた(本会主催)。その七つある議題の中から、人工妊娠中絶などの地域差に関する発表の一部を紹介し、(編集部)

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わが国では、年間およそ100万回の出生があるが、人工妊娠中絶は約20万回で、大体6人に1人の頻度で行われている。私たちがこの人工妊娠中絶に関する地域格差とその対策について研究を行った。

わが国における人工妊娠中絶には、地域格差があることが知られている。また、わが国で行われている中絶方法や薬物による方法よりも安全性が低いことが指摘されている。「このように」とが、実際はどうなのかを研究した。

まず、都道府県別の人工妊娠中絶率(表1)は、関東地方や中部地方、近畿地方などで低く、北海道や東北、それから中国、四国、九州

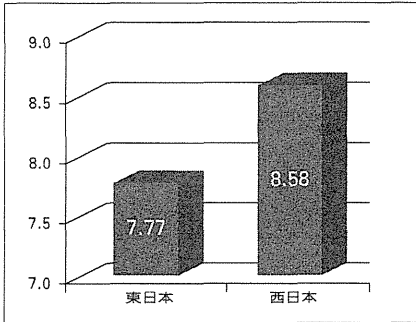


図1 東・西日本別の人工妊娠中絶率

表1 各都道府県の中絶率(妊娠可能年齢女性人口当たり、2011年)

東北地方(北海道含)						関東地方			
北海道	青森	岩手	宮城	秋田	山形	福島	茨城	栃木	群馬
9.3	8.8	9.8	9.6	9.2	8.3	10.6	5.8	8.3	8
関東地方				中部地方					
埼玉	千葉	東京	神奈川	新潟	富山	石川	福井	山梨	長野
6.3	5.3	8.5	5.9	8	7.5	7	7.7	5.2	8.2
中部地方			近畿地方						
岐阜	静岡	愛知	三重	滋賀	京都	大阪	兵庫	奈良	和歌山
7	7.9	6.5	9.2	6.8	7.2	8.1	6	4.9	7.6
中国地方				四国地方					
鳥取	島根	岡山	広島	山口	徳島	香川	愛媛	高知	
11.6	7.8	9.3	9.3	8.1	7.8	9.1	9	10.6	
九州地方(沖縄含)									
福岡	佐賀	長崎	熊本	大分	宮崎	鹿児島	沖縄	低い	高い
11.1	11	10.1	11.6	9.8	9.8	11.1	8.2		

表2 都道府県別の経口避妊薬(ピル)使用量

東北地方(北海道含)						関東地方			
北海道	青森	岩手	宮城	秋田	山形	福島	茨城	栃木	群馬
1.14	1.71	0.49	1.48	0.76	0.83	0.89	1.84	1.69	1.40
関東地方				中部地方					
埼玉	千葉	東京	神奈川	新潟	富山	石川	福井	山梨	長野
2.05	2.47	4.30	2.61	0.7	1.5	1.17	0.94	1.51	0.92
中部地方			近畿地方						
岐阜	静岡	愛知	三重	滋賀	京都	大阪	兵庫	奈良	和歌山
1.18	1.11	2.21	1.11	1.21	0.88	1.96	1.51	2.19	0.84
中国地方				四国地方					
鳥取	島根	岡山	広島	山口	徳島	香川	愛媛	高知	
0.65	0.40	0.84	1.63	1.12	0.55	0.95	0.73		
九州地方(沖縄含)									
福岡	佐賀	長崎	熊本	大分	宮崎	鹿児島	沖縄	低い	高い
1.13	0.98	0.59	0.77	0.84	0.69	0.68	1.72		

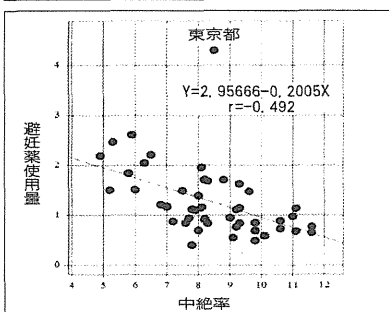


図2 都道府県別の人工妊娠中絶率と経口避妊薬使用量の関係

都道府県別の人工妊娠中絶率と経口避妊薬使用量の関係

各都道府県の中絶率を調べた。そうすると、非常に低い相関が見られた(図2)。やはり人工妊娠中絶は、絶対的に関東、中部、近畿地方では、使用量が多い。そして、北海道、東北、中国、四国、九州では使用量が多い。ピルへの避妊法の教育、市民の使用量が多いと、中絶率は有意に低いということが分かった。

都道府県別のピル使用量

量、東京都が飛び抜けて高いが、全体的には都市部で多く、地方で少ないという傾向が見えた。人工妊娠中絶率とピル使用量の間には、有意な負の相関が見られた。ここから、避妊法に関する多様な啓発が重要であることが示唆される。

若年者への教育、学校での性教育の充実化、市民への避妊法の教育、また医師へのピルの積極的な処方への教育も必要だと考えられる。



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が上げれば、係も有意差があった。各県。高いほど、都道府県の出産年齢が高くなると、中絶率も高くなる。つまり、中絶率は低い。つまり、カップルが早く結婚して、さらに、20代の男女未婚率。結婚していない率が上がると、10代の妊娠は問題だとい

10代の妊娠は問題だとい

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調査から見えた人工妊娠

表3 人工妊娠中絶実態調査(2012年1~12月)

人工妊娠中絶数(全国4154施設中、回答2434施設(回答率58.6%))			
	全週数	妊娠12週未満	妊娠12週以上
総数	108,148(100%)	100,851(93.3%)	7,297(6.7%)
病院	19,339(17.9)	15,946(15.8)	3,393(46.5)
診療所	88,809(82.1)	84,905(84.2)	3,904(53.5)

人工妊娠中絶の各方法の件数と割合(%)					
	全方法	掻爬法	吸引法	併用法	薬物法
妊娠12週未満	100,851	32,958(32.7)	20,458(20.3)	47,148(46.8)	287(.3)
病院	15,946	7,755(48.6)	1,952(12.2)	6,194(38.8)	45(.3)
診療所	84,905	25,203(29.7)	18,506(21.8)	40,954(48.2)	242(.3)
妊娠12週以降	7,297	590(8.1)	90(1.2)	887(12.2)	5,730(78.5)
病院	3,393	245(7.2)	5(.1)	173(5.1)	2,970(87.5)
診療所	3,904	345(8.8)	85(2.2)	714(18.3)	2,760(70.7)

母体保護法指定医師のいる全国の産婦人科4154施設に対して、2012年の人工妊娠中絶術についてアンケート調査を行った。人工妊娠中絶は、わが国で年間およそ20万件行われている(表3)。

中絶の82%は診療所で実施

若年者への教育をどのように行っているかを全国の高校にアンケートした。これによると、「性に関する指導」は、ほとんどが26.6%と大部分を占めている。指導者の半分は教師で、医師、助産師、看護士は、ほとんどの学校で行っていない。医師の割合は少ない。医師の割合は、ほとんどの学校で行っていない。医師の割合は、ほとんどの学校で行っていない。医師の割合は、ほとんどの学校で行っていない。

思春期保健相談士の積極的な関与に希望

実際の教育(複数回答可)は、男性用コンドーム39.3%、女性用コンドーム19.5%、ピルが35%。ピルに関しては、これくらいしかないのかと、意外な結果であった。緊急避妊薬の指導も、関係も、63%しか含まれていない。それから、教育内容に10代の人工妊娠中絶率の増加を盛り込んでいるのは、86.6%だった。

中絶の82%は診療所で実施されている。回答の中絶数を全て合すると10万8148となるので、このデータはわが国の人工妊娠中絶の半分以上のデータといえる。人工妊娠中絶全体のうち、妊娠12週未満が93.3%で、12週以上は6.7%。場所に関しては、病院で行われるのが17.9%と少なく、82.1%が診療所。妊娠12週以上を一番行っているのは新潟県、福井県、山梨県、石川県、福井県、青森県と続く。53.5%と、病院より診療所の方が多くなっている。中絶術の方法に関しては、12週未満は掻爬法が32.7%、吸引法が20.3%、併用法(吸引と掻爬)が46.8%と、併用法が一番多い。推奨されていない方法だが、薬物法も28.7件あった。病院だけで見ると、掻爬法が一番多い。これが12週以降になると全

合併症から見える中絶法の「慣れ」

人工妊娠中絶の地域差を見た(表5)。掻爬法を一番行っているのは新潟県、福井県、山梨県、石川県、福井県、青森県と続く。53.5%と、病院より診療所の方が多くなっている。中絶術の方法に関しては、12週未満は掻爬法が32.7%、吸引法が20.3%、併用法(吸引と掻爬)が46.8%と、併用法が一番多い。推奨されていない方法だが、薬物法も28.7件あった。病院だけで見ると、掻爬法が一番多い。これが12週以降になると全

表5 都道府県別人工妊娠中絶術の各方法の施行頻度(妊娠12週未満、多い順、上位5県)

都道府県	掻爬法		吸引法		併用法	
	件数	(%)	件数	(%)	件数	(%)
新潟県	1282	(71.1)	237	(57.4)	144	(95.4)
群馬県	792	(65.5)	552	(55.4)	914	(79.8)
石川県	569	(60)	832	(55.3)	1056	(72.7)
鳥取県	255	(58.6)	394	(37.8)	986	(70.9)
青森県	752	(56.7)	784	(37.2)	466	(70.4)

表6 都道府県別の合併症頻度(妊娠12週未満、10万件当たり、多い順、上位5県)

都道府県	掻爬法		吸引法		併用法	
	頻度	頻度	頻度	頻度	頻度	頻度
福井県	1452.8	山梨県 14285.7	栃木県 1176.5	鳥取県 3333.3		
鳥取県	1379.3	福井県 4545.5	長野県 579.7	山口県 2222.2		
栃木県	857.6	岩手県 3133.9	愛知県 496.0	青森県 1582.3		
山口県	797.3	佐賀県 2586.2	東京都 431.0	香川県 1515.2		
岩手県	757.6	福岡県 1666.7	福井県 421.9	広島県 766.3		
		新潟県 156.0				

合併症の件数と頻度(対10万件)(妊娠12週未満)

合併症	全方法	掻爬法	吸引法	併用法	薬物法
全合併症	358(100%)	194*.#	23	139*	2
遺残(要再手術)	295(82%)	166*.#	20	107*	2
子宮穿孔	19(5%)	12	1	6	0
大量出血	17(5%)	6	2	9	0
頻度					
全合併症	355	589	112	295	697
遺残(要再手術)	293	504	98	227	697
子宮穿孔	19	36	5	13	0
大量出血	17	18	10	19	0

*p<0.001 vs 吸引法、#p<0.001 vs 併用法

るのではないかと。慣れているところは、おられる先生方を一気にか、今すぐに吸引法に変えたいのか、という問題が、ここに出て来

(文責・編集部)

