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HEMATOLOGY

Prevalence of Anemia among Healthy Women in 2 Metropolitan Areas of Japan

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Abstract

Anemia is common among young women, and iron deficiency is one of the leading causes. In Europe and the US, the iron fortification of flour increased oral iron intake and decreased anemia prevalence from 30% to 10%. The National Nutrition Survey in Japan revealed that anemia prevalence among young Japanese women is increasing; however, no nationwide preventive policy has been aimed at iron deficiency anemia. The endpoint of this study was the estimation of anemia prevalence among healthy Japanese woman, based on a large sample size. We collected data from the consecutive check-up examination records of apparently healthy women (n = 13,147). We defined hemoglobin lower than 12 g/dL as anemia, hemoglobin lower than 10 g/dL as severe anemia, and a mean corpuscular volume lower than 80 fl as microcytic anemia. Of the 13,147 persons, anemia was identified in 2331 (17.3 %), and severe and microcytic anemia in 438 (3.3 %) and 700 (5.2 %), respectively. Among women younger than 50 years, anemia was identified in 22.3 %, and 25.2 % of them had severe anemia. In conclusion, the prevalence of anemia and severe anemia among young women is high in Japan. Some action needs to be considered to improve women's quality of life.

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Key words: Iron deficiency; Erythropoietin; Hematological abnormalities; Hemoglobin; Mean corpuscular volume (MCV); Thrombocytopenia; Anemia in the elderly; Women's health; Iron fortification

1. Introduction

Anemia is common among young women. The National Health and Nutrition Examination Survey (NHENES) revealed that an insufficient iron intake was one of the leading causes of anemia in the US. In Europe and the US, the iron fortification of flour increased oral iron intake, and the prevalence of anemia consequently decreased from 30% to 10% [1].

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There are 3 epidemiological studies on anemia among Japanese women [2-4]. Uchida et al studied abnormal iron metabolism among 3015 women from 1981 to 1991 [2]. The lifestyle at the time of the study, more than 20 years ago, was probably different from the present one. The authors did not report the prevalence of anemia. Maeda et al studied chronological changes in the prevalence of anemia in junior and senior high school students between 1966 and 1997 [3]. They did not report anemia prevalence among the population except for junior and senior high school students. The only epidemiological study on anemia among Japanese women after the 1990s was the National Nutrition Survey in Japan (NNSJ) by the Ministry of Health, Labour and Welfare [4]. The study mainly included elderly women; only 37% were younger than 50. There are insufficient epidemiological data on anemia among young Japanese women.

We investigated the prevalence of anemia in Japanese women, mostly young women, collecting data from the medical records of check-up examinations for apparently healthy people and the staff of Toranomon Hospital and Yuai Memorial Hospital.

2. Material and Methods

2.1. Data Collection

We collected data from the consecutive check-up examination records of apparently healthy women in different age groups in Toranomon Hospital (between January 2002 and March 2005; n = 8265) and Yuai Memorial Hospital (between February 1998 and February 2005; n = 5153).

2.2. Definitions

We defined hemoglobin lower than 12 g/dL as anemia, hemoglobin lower than 10 g/dL as severe anemia, and a mean corpuscular volume lower than 80 fl as microcytic anemia. Complete blood cell counts were analyzed using routine blood counting analyzers (XE-2100; Sysmex, Kobe, Japan in Toranomon Hospital and Coulter Gen-S; Beckman Coulter, Fullerton, CA, USA in Yuai Memorial Hospital).

2.3. Objectives and Statistical Analysis

This study aimed to estimate the prevalence of anemia, severe anemia, and microcytic anemia among healthy Japanese women, and to evaluate the association between these variables and age. The Fisher exact test was used for univariate analysis. A P value of less than .05 was considered significant. All analyses were performed with the statistical software JMP (version 5.01; SAS Institute, Cary, NC, USA).

3. Results

3.1. Prevalence of Anemia, Severe Anemia, and Microcytic Anemia

The median age was 47 years (range, 11-87 years). Anemia was diagnosed in 2331 (17.3%), including severe anemia in 438 (3.3%) and microcytic anemia in 405 (3.0%) (Table 1).

3.2. Age-Specific Prevalence of Anemia

Table 2 and Figure 1 present the age-specific prevalence of anemia. The prevalence of anemia was high among those in their 20s to 40s, and tended to decrease above 50 years. The median hemoglobin levels in each age group were strongly correlated with the prevalence of anemia (Figure 1, R = 0.96). The prevalence of severe anemia and the median hemoglobin levels in each age group were also positively associated (R = 0.80).

3.3. Platelet and White Blood Cell Counts

White blood cell and platelet counts are tabulated in Table 2.

Table 1.
Characteristics of Women Included in the Study

	Median (range)
Age	47 (11-87)
Toranomon Hospital/Yuai Memorial Hospital	8265/5153
Hemoglobin, g/dL	13.0 (4.4-17.7)
Red blood cell count, $\times 10^9$/L	4.52 (1.98-6.03)
Hematocrit, %	39.0 (17.4-53.4)
Mean corpuscular volume, fl	91.2 (54.0-116.6)
Mean corpuscular hemoglobin concentration, g/dL	33.2 (24.3-37.9)
White blood cell count, $\times 10^9$/L	6.3 (1.9-17.0)
Platelet count, $\times 10^9$/L	243.0 (100.0-792.0)
Anemia prevalence, %	2331 (17.3)
Severe anemia prevalence, %	438 (3.3)
Mircocytic anemia prevalence, %	405 (3.0)

4. Discussion

In the present study, the prevalence of anemia was 17.3%. Of the anemic women, 18.7% had severe anemia and 17.3% microcytic anemia. The high prevalence of anemia in Japan is a significant clinical issue; the situation is similar to that in other Asian countries and Northern Europe, where no food products are fortified with iron [5,6].

The prevalence of anemia in those under 50 was 22.3%. It was as high as 25.8% in those aged 40-49 years; of those with anemia in that age group, 25.2% had severe anemia and 25.6% microcytic anemia. In contrast, the prevalence of anemia in those aged 50 and older was 11.2%, which was lower than that in younger women. The high prevalence among those aged 40-49 years in the present study is consistent with the previous reports [7], suggesting that anemia in this age group is due to a loss of iron from menstruation and menorrhagia.

The present study suggests that the prevalence of anemia is increasing among young Japanese women. Although there are few reports on chronological changes in the prevalence of anemia among Japanese women, compared with the results of the NNSJ among women aged 30-49 in 1990, our findings suggest that the prevalence of anemia has risen from 20% to 24% [4]. Maeda et al showed an increase in the prevalence of anemia among Japanese female adolescents [3]. The national average of oral iron intake has decreased from 10.8 mg/day in 1975 to 8.1 mg/day in 2003, and the average oral iron intake among women aged 18-29 was 7.0 mg/day in 2003 [4]. A possible cause of decreased iron intake is the popularity of weight-loss diets among young Japanese women, and increased iron loss may be due to an increase in menorrhagia, although the definitive cause remains unknown. A more detailed study is necessary regarding the causes of anemia in young Japanese women. In contrast, the prevalence of anemia in the elderly in the present study is equivalent to that of the NNSJ in 1990 [4]. The observation suggests that the causes of anemia in menopausal women are different from those in young women, probably being related to aging and various medical conditions [8-10]. There have been few studies on the causes of anemia among the elderly, and further study is awaited.

Table 2.
Complete Blood Count and Anemia Prevalence According to Age*

	10-19 y	20-29 y	30-39 y	40-49 y	50-59 y	60-69 y	≥ 70 y
Number of women included	121	1896	2157	3276	3704	1785	478
Hemoglobin, g/dL	13.0 (8.7-15.7)	12.9 (5.5-17.1)	12.8 (4.4-16.2)	12.8 (5.4-15.8)	13.1 (6.0-17.4)	13.2 (8.4-17.7)	13.1 (8.4-15.6)
Red blood cell count, $\times 10^{12}$/L	4.48 (3.68-5.47)	4.90 (2.00-5.94)	4.59 (2.57-5.67)	4.65 (2.80-5.63)	4.50 (2.20-5.68)	4.40 (3.00-6.03)	4.25 (3.07-5.01)
Hematocrit, %	39.1 (29.2-46.2)	38.6 (17.4-49.2)	38.4 (18.1-47.2)	38.5 (20.8-47.2)	39.5 (21.9-52.0)	39.7 (26.7-53.4)	39.5 (28.8-46.7)
Mean corpuscular volume, fl	88.0 (64.0-98.0)	90.0 (57.0-105.4)	90.4) (59.0-116.6	90.7 (58.0-109.0)	92.0 (54.0-112.1)	93.0 (71.9-104.8)	93.6 (73.6-103.3)
Mean corpuscular hemoglobin concentration, g/dL	33.2 (28.3-35.4)	33.3 (26.7-37.9)	33.2 (24.3-35.8)	33.1 (24.5-36.3)	33.2 (24.4-36.4)	33.2 (30.6-35.8)	33.1 (28.2-35.3)
White blood cell count, $\times 10^9$/L	5.9 (2.4-17.0)	9.2 (2.4-12.7)	7.4 (2.1-14.0)	7.0 (2.2-14.4)	5.6 (1.9-11.4)	5.3 (2.3-11.6)	5.3 (2.1-12.1)
Platelet count, $\times 10^9$/L	263.0 (135.0-578.0)	244.0 (94.0-501.0)	247.0 (50.0-572.0)	252.0 (47.0-649.0)	240.0 (100.0-610.0)	232.0 (56.0-792.0)	230.0 (26.0-426.0)
Anemia prevalence, %†	15.7	18.0	21.1	25.8	12.8	7.7	11.5
Severe anemia prevalence, %	3.3	1.9	3.8	6.5	2.6	0.2	0.8
Microcytic anemia prevalence, %	9.1	2.2	4.3	6.6	1.1	0.1	0.4

*Data are written as median value (range).
†Anemia prevalence includes severe anemia.

The present study showed that anemia is a significant issue among young Japanese women, although the interpretation requires caution. First, the study subjects were health-conscious women who resided in a metropolitan area and came for check-up examinations at the two hospitals, suggesting the possible existence of a selection bias. Second, since no data are available on serum chemistries, symptoms, and physical examination regarding iron metabolism, we cannot assess the causes of anemia based on the present study. Last, the numbers of women varied between the different age groups. Any future study should include equal numbers of women for a more precise analysis. A prospective, nationwide study is awaited, to assess the prevalence of anemia in a larger sample size.

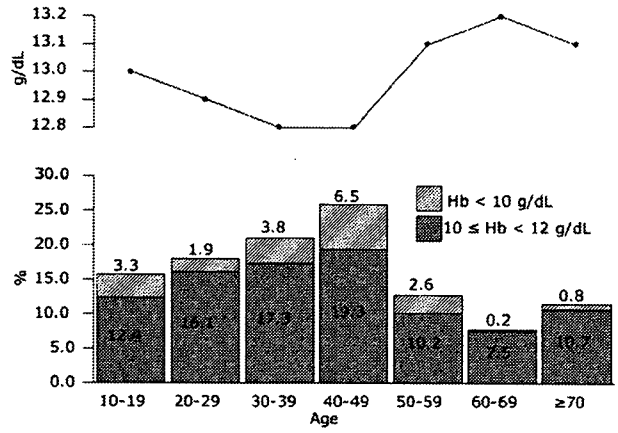

Figure 1. Prevalence of anemia and median hemoglobin levels according to age groups.

The high prevalence of anemia in young Japanese women is a significant clinical issue. In many cases, the causes are probably insufficient iron intake and iron deficiency due to iron loss. Anemia is likely to adversely affect young women's health. Nationwide consideration and an epidemiological approach are necessary.

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Clinical Studies

Clinical outcome and risk factors for recurrence in borderline ovarian tumours

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We investigated the long-term prognosis of borderline ovarian tumours and determined risk factors for recurrence. One hundred and twenty-one borderline ovarian tumours treated between 1994 and 2003 at the participating institutions in the Tohoku Gynecologic Cancer Unit were retrospectively investigated for clinical stage, histopathological subtype, surgical technique, postoperative chemotherapy, the presence or absence of recurrence, and prognosis. The median follow-up period was 57 months (1–126 months). One hundred and nine cases (90.6%) were at clinical stage I. The histopathological subtypes consisted of 91 cases of mucinous tumour (75.2%), 27 cases of serous tumour (22.3%), and three cases of endometrioid tumour. Conservative surgery was used in 53 cases (43.8%), radical surgery in 68 cases (56.2%), a staging laparotomy in 43 cases (35.5%), and postoperative adjuvant therapy in 30 cases (24.8%). Recurrence was found in eight cases, but no tumour-related deaths were reported. Although no significant difference in disease-free survival rate was seen between different clinical stages, the difference in disease-free survival rate between serous and nonserous (mucinous and endometrioid) types was significant ($P<0.05$). The 10-year disease-free survival rate was 89.1% for the radical surgery group and 57.4% for the conservative surgery group – this difference was significant ($P<0.05$). In the conservative surgery group, cystectomy and serous tumour were independent risk factors for recurrence. Although recurrence was observed, the long-term prognosis of borderline ovarian tumour was favourable, without tumour-related deaths. Considering the favourable prognosis, conservative surgery can be chosen as far as the patient has a nonserous tumour and receive adnexectomy. However, in cases of serous type and/or receiving cystectomy special care should be given as relative risk rates of recurrence elevate by 2–4-folds.

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Taylor (1929) found that some epithelial ovarian tumours showed clinically intermediate behaviour between benign and malignant, and called them 'semimalignant'. The International Federation of Gynecology and Obstetrics (FIGO) has formally introduced this concept as 'carcinoma of low malignant potential' in 1971, and the World Health Organization (WHO) as 'borderline tumour' in 1973, when the histological diagnostic criteria was proposed. The concept of borderline ovarian tumours was histologically defined as a disease entity that had been proposed clinically, and the adequacy of this histological definition has been repeatedly verified clinically.

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With an accumulated experience and knowledge regarding the characteristics and management of borderline ovarian tumours, reclassification and redefinition have been attempted (Seidman and Kurman, 1996), and new prognostic factors have been proposed (de Nictolis *et al*, 1992; Gershenson *et al*, 1999). At present, many conflicting reports are causing confusion. As many of the patients are relatively young (Harris *et al*, 1992), preservation of fertility has been attempted with favourable results (Morice *et al*, 2001). However, there are also reports of recurrence or poor prognosis (Kaern *et al*, 1993; Gilks, 2003), and more precise prognostic factors are required. We believe that it is important to get a clear picture of the present status of borderline ovarian tumours, as it has been more than 30 years since the introduction of the concept of these tumours. Our retrospective multicentre study conducted an overall clinical analysis of borderline ovarian tumours. Our ultimate aim is to investigate the long-term prognosis of borderline ovarian tumours, and to determine the risk factors for recurrence.

patients (24.0%) were above 60 years of age (Table 1). The follow-up period varied from 1 to 126 months, with a median of 57 months. One hundred and nine patients (90.6%) had stage I disease, two had stage II disease, and nine had stage III and IV disease (Table 1). The dominant histopathological subtypes were mucinous (91 cases; 75.2%) and serous (27 cases; 22.3%) (Table 1). Only three tumours (2.5%) were of endometrioid type. Seventy-five (82.4%) and 16 of the 91 mucinous borderline tumours were intestinal and endocervical types, respectively. Radical treatment was performed in 68 (56.2%) patients, and 53 (43.8%) patients underwent conservative management (Table 1). Complete surgical staging was performed in 43 (35.5%) patients (Table 1). Adjuvant chemotherapy was given to 30 (24.8%) patients (Table 1). Seventeen patients were lost to follow-up, and two patients died of the other diseases (Table 1). Four patients had a mucinous tumour with pseudomyxoma peritonei and were excluded from the present study because presence of pseudomyxoma peritonei changes the scope of management and the category of pseudomyxoma peritonei is recognised as tumour that can simulate primary mucinous borderline ovarian tumour (Ronnett *et al*, 2004).

Among 102 patients who were finally evaluated for clinical outcome and prognostic factors, eight had tumour recurrence but none of them died of the disease (Table 1). The median time to recurrence was 46 ± 33 months (range 14–107 months). The 5- and 10-year disease-free survival rates were 91.7 and 69.2% for stage I diseases, respectively, and the 5- and 7-year disease-free survival rates were 100 and 66.7% for stage II–IV diseases, respectively (Figure 1A). The 10-year disease-free survival rate was 91.5 and 36.0% for mucinous and serous tumours, respectively (Figure 1B). Although no significant differences in disease-free survival rate were seen between different clinical stages, the difference between serous and nonserous (mucinous and endometrioid) types was significant. On the other hand, the 10-year disease-free survival rate was 89.1% for the radical surgery group and 57.4% for the conservative surgery group (Figure 1C). This difference was significant ($P<0.05$). In univariate analysis, serous type and conservative surgery were found to be important variables affecting recurrence of disease (Table 2). Frequency of recurrence was not influenced by clinical stage, staging laparotomy, and postoperative adjuvant chemotherapy (Table 2). Multivariate analysis showed that only conservative surgery had independent prognostic value regarding recurrence of disease (Hazard ratio 2.2, 95% confidence interval, 0.02–0.52) (Table 2). Subsequently, risk factors for recurrence were evaluated among 43 patients who underwent conservative surgery (Table 3). Of these patients, six had tumour recurrence (Table 3). Three of eight patients who had cystectomy and three of 35 patients who had adnexectomy experienced tumour recurrence (Table 3, $P<0.03$). Recurrence occurred more frequently in patients with serous tumour than with nonserous tumour (Table 3). No correlation was found between recurrence and the factors such as clinical stage, staging laparotomy, or postoperative adjuvant chemotherapy among conservative surgery group (Table 3). Multivariate analysis confirmed cystectomy and serous type as an independent risk factor for recurrence of disease among the patients who underwent conservative surgery (Table 3). Table 4 shows estimated relative risk of having recurrence of disease for different combination of procedure of conservative surgery and histopathological subtype. For example, the relative risk for a patient receiving cystectomy for her serous tumour is 4.33 times greater than the risk for a patient receiving adnectomy for her nonserous tumour.

The clinical and pathological features of the eight patients who developed recurrence were demonstrated in Table 5. None of these eight patients died of progression of their disease. Three of the four serous tumours with recurrence were a noninvasive peritoneal implant, one of which was diagnosed as a serous adenocarcinoma at recurrence. The case developed adenocarcinoma in contralateral ovary 107 months after cystectomy. All mucinous tumours with recurrence were of intestinal subtype. All patients with recurrence who were initially treated conservatively are free of disease after secondary surgical treatment.

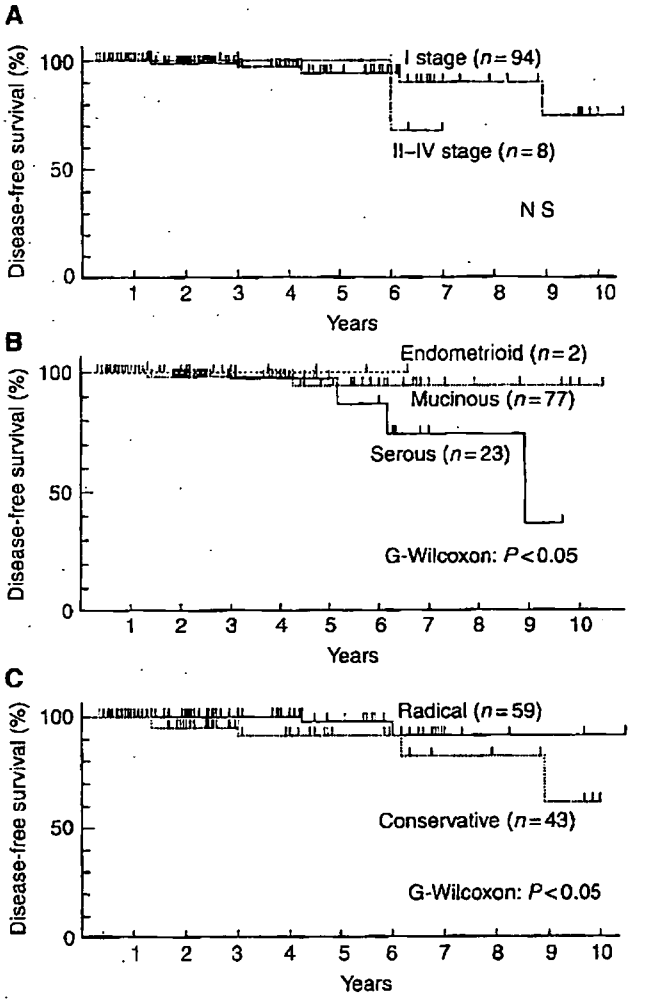

Figure 1 (**A**) Clinical stages and disease-free survival in patients with borderline ovarian tumour. There is no significant difference between two curves. (**B**) Histological type and disease-free survival in patients with borderline ovarian tumour. There is significant difference in disease-free survival between serous and nonserous (mucinous and endometrioid) type ($P<0.05$). (**C**) Surgical procedure and disease-free survival in patients with borderline ovarian tumour. There is significant difference between two curves ($P<0.05$).

DISCUSSION

It has been shown that the 5-year survival rate was 95–97% for stage I and 65–87% for stages II and III (Trope *et al*, 2000; Trimble *et al*, 2002; Sherman *et al*, 2004) suggesting that the prognosis for borderline ovarian tumours depends on extraovarian extension of the tumour. In addition, prognostic factors included clinical stage, histopathological subtype, and residual tumour, but the surgical method was not regarded as a prognostic factor (Trope *et al*, 2000; Gilks, 2003). The results of the present study, however, showed neither the stage nor the histopathological subtype of the disease was related with long-term prognosis, but showed that disease-free survival rates were significantly lower in cases managed by conservative surgery (Figure 1).

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The clinical and pathological features of the eight patients who developed recurrence were demonstrated in Table 5. None of these eight patients died of progression of their disease. Three of the four serous tumours with recurrence were a noninvasive peritoneal implant, one of which was diagnosed as a serous adenocarcinoma at recurrence. The case developed adenocarcinoma in contralateral ovary 107 months after cystectomy. All mucinous tumours with recurrence were of intestinal subtype. All patients with recurrence who were initially treated conservatively are free of disease after secondary surgical treatment.

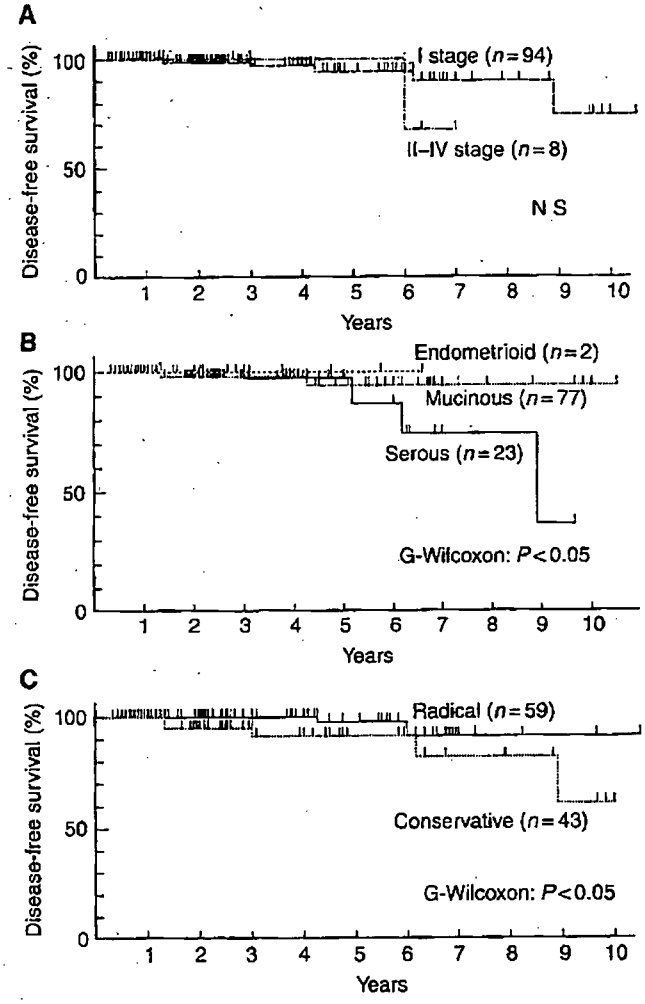

Figure 1 (**A**) Clinical stages and disease-free survival in patients with borderline ovarian tumour. There is no significant difference between two curves. (**B**) Histological type and disease-free survival in patients with borderline ovarian tumour. There is significant difference in disease-free survival between serous and nonserous (mucinous and endometrioid) type ($P<0.05$). (**C**) Surgical procedure and disease-free survival in patients with borderline ovarian tumour. There is significant difference between two curves ($P<0.05$).

DISCUSSION

It has been shown that the 5-year survival rate was 95–97% for stage I and 65–87% for stages II and III (Trope *et al*, 2000; Trimble *et al*, 2002; Sherman *et al*, 2004) suggesting that the prognosis for borderline ovarian tumours depends on extraovarian extension of the tumour. In addition, prognostic factors included clinical stage, histopathological subtype, and residual tumour, but the surgical method was not regarded as a prognostic factor (Trope *et al*, 2000; Gilks, 2003). The results of the present study, however, showed neither the stage nor the histopathological subtype of the disease was related with long-term prognosis, but showed that disease-free survival rates were significantly lower in cases managed by conservative surgery (Figure 1).

Table 2 Risk factors for recurrence in borderline tumours

Factors	Recurrence ($n=8$)	No recurrence ($n=94$)	Univariate P	Multivariate P
Mean age (years)	42.2 ± 13.7	43.5 ± 16.2		
Histology, n (%)				
Serous	4 (50)	19 (20.2)		
Nonserous	4 (50)	75 (79.8)	0.053	0.09
Surgical procedure, n (%)				
Radical	2 (33.3)	57 (60.6)		
Conservative	6 (66.7)	37 (39.4)	0.05	0.031
Staging laparotomy, n (%)				
Staged	3 (37.5)	36 (38.3)		
Unstaged	5 (62.5)	58 (61.7)	0.96	0.58
Stage, n (%)				
I	7 (87.5)	87 (92.6)		
II–IV	1 (12.5)	7 (7.4)	0.61	0.79
Adjuvant chemotherapy, n (%)				
Yes	4 (50)	22 (23.4)		
No	4 (50)	72 (76.6)	0.098	0.33

Table 3 Risk factors for recurrence in the patients who underwent conservative surgery for borderline tumours

Factors	Recurrence ($n=6$)	No recurrence ($n=37$)	Univariate P	Multivariate P
Surgical procedure, n (%)				
Cystectomy	3 (50)	5 (13.5)		
Adnexectomy	3 (50)	32 (86.5)	0.03	0.047
Staging laparotomy, n (%)				
Staged	1 (16.7)	3 (8.1)		
Unstaged	5 (83.3)	34 (91.9)	0.51	0.137
Adjuvant chemotherapy, n (%)				
Yes	3 (50)	7 (18.9)		
No	3 (50)	30 (81.1)	0.095	0.593
Stage, n (%)				
Ia	3 (50)	23 (62.2)		
Ic	3 (50)	14 (37.8)	0.57	0.198
Histology, n (%)				
Serous	3 (50)	6 (16.2)		
Non-serous	3 (50)	31 (83.8)	0.059	0.041

Table 4 Relative risk of recurrence in borderline tumours

Conservative surgery	Histological type: Nonserous	Histological type: Serous
Adnexectomy	1	2.11
Cystectomy	2.05	4.33

In our study, surgical procedure was found to be an independent risk factor for recurrence and the risk could be reduced by radical surgery (Table 2). Because borderline tumours are seen more frequently in younger females than definitive carcinomas (Harris *et al*, 1992), whether conservative surgery is appropriate for

Table 5 Eight patients with borderline tumour who developed recurrence

Age	Histological type	Stage	Initial surgery	Staging procedure	Adjuvant chemotherapy	Time to recurrence	Site of recurrence	Treatment after recurrence	Histology of recurrence site	Status
33	SBT, noninvasive	Ia	Conservative (adnexectomy)	(−)	(+)	74	Intrapelvis	Surgery alone	SBT	NED
35	SBT, noninvasive	Ia	Conservative (adnexectomy)	(−)	(−)	36	Contralateral ovary	Surgery alone	SBT	NED
36	SBT, noninvasive	Ia	Conservative (cystectomy)	(−)	(+)	107	Contralateral ovary	Surgery+chemotherapy	Serous adenocarcinoma	NED
46	SBT, invasive	IIIa	Radical	(+)	(+)	62	Perihepatic	Chemotherapy alone	Unknown	AWD
28	MBT, intestinal	Ic	Conservative (cystectomy)	(−)	(−)	14	Ipsilateral ovary	Surgery alone	MBT, intestinal	NED
35	MBT, intestinal	Ic	Conservative (cystectomy)	(+)	(+)	16	Intrapelvis	Surgery alone	MBT, intestinal	NED
58	MBT, intestinal	Ic	Conservative (adnexectomy)	(−)	(−)	20	Intrapelvis	Surgery alone	MBT, intestinal	NED
67	MBT, intestinal	Ia	Radical	(+)	(−)	35	Lung	None	Unknown	AWD

SBT = serous borderline tumour; MBT = mucinous borderline tumour; NED = no evidence of disease; AWD = alive with disease.

Clinical Studies

borderline ovarian tumours is an important matter to be resolved. Zanetta *et al* (2001) reported that only three of 119 stage I (2.5%) cases that underwent radical surgery recurred, whereas 20 out of 164 stage I (12.1%) cases that underwent conservative surgery recurred, with one case resulted in death from the disease. Morice *et al* (2001) demonstrated that the majority of recurrent cases, including stages II and III, were cured completely by subsequent surgery, and few cases resulted in death. More over, Donnez *et al* (2003) reported that although recurrence was commoner in cases treated by conservative surgery (3 out of 16, 18.7%) than by radical surgery (0 out of 59, 0%), subsequent treatment resulted in no tumour-related deaths, and 63.6% of conservative surgery cases subsequently became pregnant, suggesting that conservative surgery can be an option for management of borderline malignant ovarian tumours in young subjects who need to reserve fertility. However, it is also reported that all of deaths as a result from recurrence were seen in cases treated by conservative surgery (Morris *et al*, 2000; Zanetta *et al*, 2001). Therefore, it is of quite importance to investigate underlying risk factors for recurrence after conservative surgery. As shown in Table 3, we found that cystectomy and serous tumours were independent risk factors for recurrence in patients who received conservative surgery. Previous reports have shown that recurrence after cystectomy did not necessarily occur ipsilaterally (Morris *et al*, 2000, 2001; Zanetta *et al*, 2001). So it seems that the residual tumour during cystectomy is solely responsible for recurrence. Then, it may be rational for young women who wish pregnancy to select cystectomy as an option if the surgical margin is free of tumour. However, results by Morice *et al* (2001) did not support this as they found that the recurrence rate was high after cystectomy compared with adnexectomy. Morris *et al* (2000) also demonstrated that recurrence was higher in cases treated by cystectomy rather than by adnexectomy. The present study confirmed this and further demonstrated for the first time that a difference in pathohistology affects the recurrence rate. As shown in Table 3, it was revealed that serous tumour is a significant risk factor for recurrence in cases managed by conservative surgery. Morris *et al* (2000) also showed similar tendency, but they regrettably missed statistical analysis. As shown in Table 4, the present study clearly demonstrated that the risk of recurrence when serous tumours were treated by cystectomy was approximately four times higher than for adnexectomy of nonserous tumours.

As a prognostic factor for borderline ovarian serous tumours, the concept of peritoneal implant is attracting attention (Bell *et al*, 1988). When estimating the prognosis of borderline ovarian serous tumours, peritoneal lesions should be explored and biopsied at the time of the surgery – in other words, accurate surgical staging is required. Clinical stage is one of the most important prognostic factors in borderline ovarian tumours (Kliman *et al*, 1986); and an accurate surgical staging is indispensable for follow-up after conservative surgery, as well as selecting postoperative therapy. Winter *et al* (2002) compared 48 cases that underwent complete surgical staging, and 45 cases without surgical staging – a higher stage was found in 17% (8 out of 48) of those assessed by surgical staging, but there was no difference in recurrence and survival rates between the groups. Camatte *et al* (2002) found metastasis to lymph nodes in 19% (8 out of 42) of cases. All cases with metastases were seen with borderline ovarian serous tumours associated with peritoneal dissemination, but no cases resulted in death – there was no difference in prognosis when compared with cases without metastases. The presence or absence of a peritoneal lesion is an important predictive factor of recurrence as well as an important prognostic factor, and we do not deny the importance of surgical examination of the abdominal cavity where possible. However, many reports have indicated that the presence or absence of lymph node metastasis is not related to the prognosis for borderline ovarian tumours (Camatte *et al*, 2002; Winter *et al*, 2002), and it is still debatable whether or not to perform a biopsy or dissection of the lymph nodes. As shown in Table 3, the present study could not show a significant relevance to risk of recurrence. The limitation of the present study is that surgical staging was not considered beforehand in all cases so that our data may be biased in this respect. Further studies using a prospective design with emphasis on surgical staging are required to investigate the risk of recurrence in borderline ovarian serous tumours after conservative surgery. Therefore, it is important that conservative surgery should only be performed in cases that truly require conservative surgery, after giving a full explanation of the risk of recurrence.

Barakat *et al* (1995) reported that cisplatin-based chemotherapy induced complete remission in six of 23 (26%) advanced cases with macroscopic diseases, and in 17 of 25 (68%) cases with microscopic disease, and proposed that adjuvant chemotherapy could be considered as a therapeutic option although a life-extension effect of chemotherapy was not clear. In the present study, the regimen or frequency of chemotherapy used was not uniform, and differed among institutions, and no relationship was found between the presence or absence of postoperative adjuvant chemotherapy and recurrence (Table 2). Kaern *et al* (1993) showed that adjuvant chemotherapy did not improve neither recurrence free survival nor overall survival rate in 364 cases without residual tumour. Morice *et al* (2001) demonstrated that postoperative chemotherapy did not improve the survival rate in 80 cases of advanced borderline ovarian serous tumour in stages II and III with extraovarian extension, and that deaths were more closely related to the treatment than to the tumour. Thus, the efficacy of chemotherapy for borderline ovarian tumours is not yet established.

In conclusion, although recurrence was detected in eight out of 102 cases with borderline ovarian tumour that were available for follow-up, no tumour-related deaths were found, and there was a favourable long-term prognosis. Although the relative risk of recurrence is high, conservative surgery appears to be worth trying to preserve fertility, considering the favourable prognosis. When considering conservative surgery, special care should be given when cystectomy is chosen as a surgical procedure or the histological subtype is borderline serous ovarian tumour. Consensus has not been reached on such issues as to the significance of surgical staging, the indication for postoperative adjuvant chemotherapy, or the indications for conservative surgery. To reinforce the present study results, we expect that a large scaled prospective clinical study involving many institutions will be designed to obtain more evidence.

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原著

子宮がん検診の隔年化に伴う受診状況の変遷

A state of participants in the biennial screening for uterine cancer

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Abstract

The biennial screening for uterine cancer may be afraid for a decrease of the number of first- time participant and effectiveness of screening. We determined the rates of first- time participant during 2003 to 2005 in three cities in Fukushima Prefecture. In the A-city, the first examination rate for women 30 year old or older in biennial screening of 2004 was 6.5% and significantly lower than that of 7.3% in annual screening of 2003. ($p = 0.0436$) In the B-city, the first examination rate for women 30 year old or older in biennial screening of 2004 was 10.1% and significantly lower than that of 12.0% in annual screening of 2003. ($p = 0.0007$) The C-city performed biennial screening in 2005 and made an individual public relations to participants with age from 20 to 39 years. The first examination rate in C-city significantly increased from 9.8% to 14.0%. ($p < 0.0001$)

For effective screening of uterine cancer containing increase the first screening rate, the municipality should avoid stiff biennial screening and make an adequate notice to residents.

Keyword: uterine cancer screening, biennial screening, first-time participant

はじめに

厚生労働省は2004年4月にがん予防重点健康教育およびがん検診実施のための指針（案）で、「子宮がん検診については、同一人について2年に1回行うものとする」という指針を提唱した[1]。一方、1998年の老人保健法の改正によりがん検診に対する国からの補助金が一般財源化されて以来、検診の実施は市町村の裁量に委ねられた。04年度は福島県の多くの自治体が引き続き従来の逐年検診を実施したが[2]、05年度は多くの市町村が検診対象年齢を従来の30歳から20歳への引き下げるとともに、当該年度に偶数年齢に達する者に検診を限る隔年検診を採択した。本稿では、福島県内にある人口30万人程度の3都市を対象とし、隔年検診の実施状況と住民への周知広報体制について検討し、隔年検診の実施によって生じた問題点や、効率的な検診の実施法について考察を加えた。

1. 対象と方法

福島県の子宮がん集団検診に関しては、検診車輌による検診と医療機関による施設検診が行われている。施設検診では、産婦人科の診療所や産婦人科を有する病院を全市町村と各郡市医師会の委託を受けた日本婦人科医会

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福島県支部が認定している。受診者は検診実施期間（多くの市町村は5～11月）に、主に居住地内のいずれかの医療機関の外来診療時間内に受診し、頸部細胞診を中心とした検診を受ける。細胞診検体は、福島県保健衛生協会が一括して検体を蒐集し、診断とその後の指針の決定を行い、精検や治療結果の追跡も行っている。検診結果と精検受診の勧告は、保健衛生協会から各市町村を通して各受診者に通知される。この方式により、福島県ではどの医療機関を受診しても一定のレベルでの検診を受けることが可能であり、医療機関や市町村は検診の結果確認や集計など煩雑な検診業務から解放される。受診者は1度の受診ですみ、後日細胞診結果の確認のための再受診の必要がなくなる。このような方式が福島県ではほとんどすべての市町村で実施されている。受診可能な医療機関数や受診期間に市町村ごとの若干の差があるがほぼ同じシステムで検診が行われている。

なお、検診受診者の個人情報は、厳密に管理されており、検診概況は、個人情報を配慮しつつ、年度ごとに集団検診概況および精密検診概況として報告されている。2003～05年度の子宮がん検診の集団検診概況に基づき、各年度の市町村別の年齢階級別受診者数や初回受診者数を調査した[3～5]。

対象としたのは、福島県の3つの都市、A、B、C市である。2005年1月のA市人口は290,425人、女性人口は150,145人、20歳以上の検診対象者（隔年）は60,452人、なかでも30歳以上の対象者は51,586人であり、子宮がん検診が可能な登録施設は20で、期間は7～11月の5か月であった。B市の人口は356,134人、女性人口は182,792人、20歳以上の検診対象者（隔年）は73,461人、なかでも30歳以上の検診対象者は64,253人であり、登録施設は27で、期間は7～12月の6か月であった。C市の人口は339,526人、女性人口は171,753人、20歳以上の検診対象者（隔年）は67,997人、なかでも30歳以上の検診対象者は57,001人であり、登録施設数は28で期間は5～12月の7か月あった[6]。

表1 三市での検診対象の推移と住民への通知法

		2003年度	2004年度	2005年度	住民への通知法
A市	対象年齢	30歳以上	20歳以上	20歳以上	20～29歳の対象者全員と節目検診対象者に基本検診、他のがん検診を含む受診券を送付
	受診制限	なし	偶数年齢	偶数年齢	
	前年未受診の対象外者受診	—	不可	可	
B市	対象年齢	30歳以上	30歳以上	20歳以上	広報等のみ ・各戸への保健のしおりを配布 ・市民広報月1回 ・市内大学への啓蒙活動
	受診制限	なし	なし	偶数年齢	
	前年未受診の対象外者受診	—	—	不可	
C市	対象年齢	30歳以上	30歳以上	20歳以上	20～29歳の対象者に子宮がん検診勧奨のはがきを送付
	受診制限	なし	なし	偶数年齢	
	前年未受診の対象外者受診	—	—	不可	

これらA、B、C市は県北部の県庁所在市、県中央部の経済中心都市、太平洋側に位置する港湾都市として、3市で福島県の人口の半数近くを占める。さらに人口規模や医療機関の分布等が類似しており、地方都市として検診制度の比較に適していると考えられた。3市での子宮がん検診の対象者の年齢制限や検診の間隔、すなわち逐年か隔年かといった検診制度の変遷、さらには住民への検診の案内や受診勧告についての取り組み方を調査した。

さらに、3市それぞれの検診体制の変更や受診勧告による検診受診状況の違いを明らかにすべく、2003～05年度の各市での子宮がん検診の年齢階級別受診者数や、その年度に初めて検診を受診した初回受診者数を検索した。特に、検診効率に関しては、30歳以上の受診者のなかに占める初回受診の割合を比較した。χ^2検定を用い、危険率0.05をもって有意差ありとした。

2. 結 果

表1に2003～05年度におけるA、B、C3市の検診対象年齢、逐年か隔年か、前年に受診できなかった者に対する救済的な受診が可能か否かを示した。そして、受診の通知法について示した。A市は04年度に、ほかの2市に先駆けて受診対象者を当該年度に偶数年齢に達する者に限るという隔年検診を開始した。しかし、初回受診率の減少等の問題が生じたため、05年は前年度検診を受診できなかった人々にも受診機会を与えるとういう対応策を講じた。住民への通知は、04、05年度は検診対象である当該年度に偶数年齢に達する20～39歳の女性住民全員に受診を勧める通知を送付した。この受診通知票は、図1に示すように、基本健康診査、肺がん胃がん、大腸がん、乳がん検診も含めた受診票であった。

B、Cの2市は2003、04年度は対象年齢を30歳以上とし、逐年検診をしていた。ただし、C市では20歳代でも希望者には例外的に受診を認めていた。両市は05年度は20歳以上で当該年度に偶数年齢に達する女性に限るという隔年検診を実施した。両市とも前年度受診せず、05年度に奇数年齢に達する女性に対しては原則として受診を認めていない。B市では広報を通じての通知および市内の

大学等での受診啓蒙のポスター配布のみであった。C市では、05年度は偶数年齢に達する20～39歳の女性住民全員にも受診を勧める通知を送付したが、これは図2に示すように子宮がん検診に限った受診票であった。

表2にA市での2003、04、05年度の年齢別受診者、年齢別初回受診者の比較を示した。04年度は検診対象を20歳以上とし、当該年度に偶数年齢に達する者に限る隔年検診を実施した。逐年検診であった03年度の子宮がん検診受診者数は11,669人で、検診対象人口に対する受診率は10.43％であった。一律の隔年検診とした04年度は5,790人で受診率は9.58％、前年比の50％と半減していた。そのなかで30歳以上の受診者は5,392人であった。特に30歳以上の初回検診受診者が03年度は844人（30歳以上の全受診者の7.32％）いたが、04年度は349人で、03年度の41％と半数以上減少していた。04年度の30歳以上の初回受診者が30歳以上の全受診者に占める割合は6.47％で、2003年度に比して有意に減少していた（$\chi^2 = 4.072$、$p = 0.0436$）。

一方、2005年度は、当該年度に偶数年齢に達する者に加えて、前年度検診を受けなかった者に対しても受診を認めることと変更した。05年度の子宮がん検診受診者数は7,972人で前年比137.7％と増加し、受診率も13.19％と上昇した。20～29歳の受診者の増加は106.9％とわずかであった。30歳以上の受診者は7,547人で前年比の140.0％と増加した。特に30歳以上の初回受診者数は593人で、30歳以

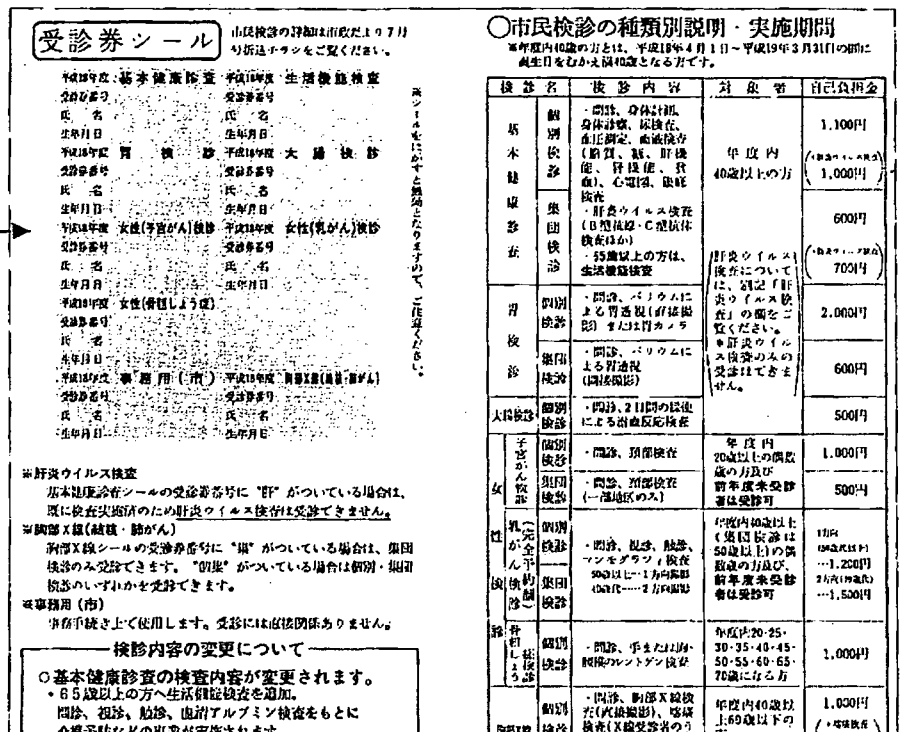

図1 A市で配布された検診の案内
他の検診と一緒で子宮がん検診の受診券（→）がわかりづらい。

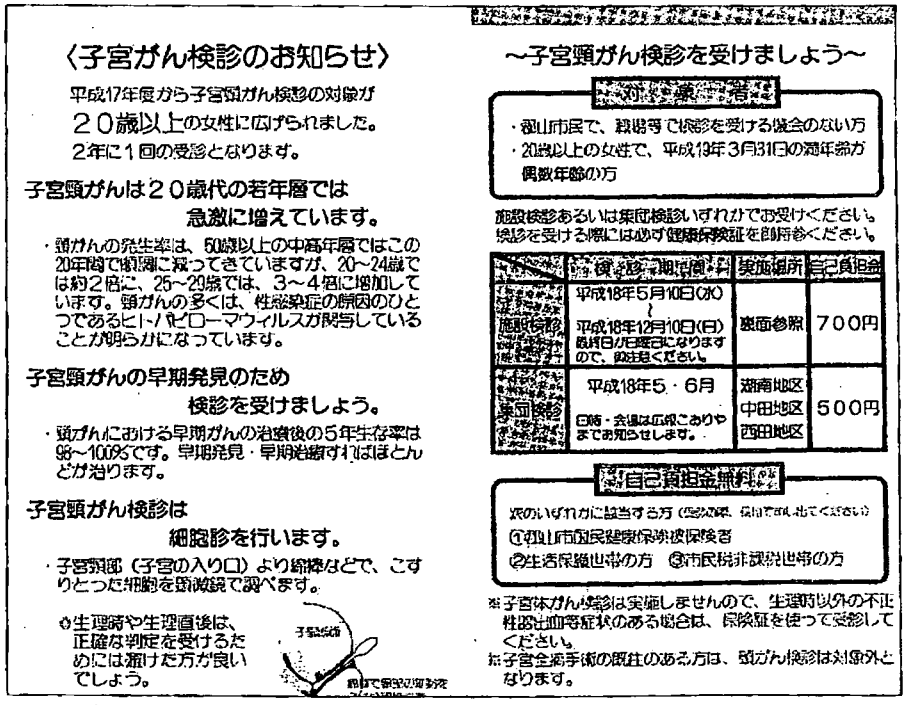

図2 C市で配布された検診の案内
子宮がん検診のみの案内で対象者にわかりやすい。

上の受診者中、初回受診者の占める割合は7.86％で04年に比して有意に増加していた（$\chi^2 = 8.936$、$p = 0.0028$）。また、05年度と03年度を比較すると、30歳以上の受診者に占める初回受診者の割合には有意差は認められなかった（$\chi^2 = 1.854$、$p = 0.173$）。

表3にB市での2003～05年度の年齢別受診者、年齢別初回受診者の比較を示した。03、04年度は、30歳以上のすべての女性を対象とする逐年検診を実施した。03年度は、8,686人が受診し受診率は6.80％、初回受診者は1,013人で初回受診率は11.66％であった。04年度は、9,893人が受診し受診率は7.15％、初回受診者は1,184人で11.96％であった。隔年検診を実施した05年度は、5,579人が受診し受診率は7.59％、30歳以上の受診者は5,018人で前年の50.73％と半減した。初回受診者は949人で30歳以上の初回受診者は507人であった。30歳以上の受診者に対して初回受診者の占める割合は、10.10％と前年度より有意に減少していた（$\chi^2 = 11.405$、$p = 0.0007$）。

表4にC市での2003～05年度の年齢別受診者、年齢別初回受診者の比較を示した。03、04年度は、30歳以上のすべての女性住民を対象とする逐年検診を実施した。03年度は、10,026人が受診し受診率は8.04％、初回受診者は1,181人であった。30歳以上の受診者は9,918人で、30歳以上の初回受診者は1,097人で11.06％を占めた。04年度は、8,698人が受診し受診率は6.91％、初回受診者は894人であった。30歳以上の受診者は8,624人で30歳以上の初回受診者は848人で9.83％を占めた。

隔年検診を実施した2005年度は、6,763人が受診し受診率は9.95％、30歳以上の受診者は5,552人で前年の64.39％と減少したが半減はしなかった。初

表2　A市の検診受診者および初回受診者の推移（前々年度の逐年検診との比較）

年代	平成15年度（逐年）受診者数（人）	平成16年度（隔年）受診者数（人）	対前年度比（%）	平成17年度（隔年）受診者数（人）	対前年度比（%）
～29	147	398	271	425	107
30～39	2,260	972	43	1,236	127
40～49	2,433	1,208	50	1,574	130
50～59	2,897	1,371	47	2,034	148
60～69	2,676	1,235	46	1,852	150
70～	1,256	606	48	851	140
計（全年代）	11,669	5,790	50	7,972	138
計（30歳以上）	11,522	5,392	47	7,547	140
年代	平成15年度初回受診者数（人）	平成16年度初回受診者数（人）	対前年度比（%）	平成17年度初回受診者数（人）	対前年度比（%）
～29	114	328	288	345	105
30～39	614	242	39	308	127
40～49	110	62	56	150	242
50～59	54	21	39	55	262
60～69	30	14	47	42	300
70～	36	10	28	38	380
計（全年代）	958（8.2%）注1)	677（11.7%）	70	938（11.8%）	139
計（30歳以上）	844（7.3%）注2)	349（6.5%）	41	598（7.9%）	170

*1　*2　*3

注1）全受診者に対する全初回受診者の割合
注2）30歳以上の受診者に対する30歳以上の初回受診者の割合
*1：p=0.0436、*2：p=0.0028、*3：p=0.173

表3　B市の検診受診者および初回受診者の推移（前々、前年度の逐年検診との比較）

年代	平成15年度（逐年）受診者数（人）	平成16年度（逐年）受診者数（人）	対前年度比（%）	平成17年度（隔年）受診者数（人）	対前年度比（%）
～29	0	0	—	561	—
30～39	2,212	2,553	115	1,126	44
40～49	2,239	2,484	111	1,350	54
50～59	2,184	2,475	113	1,352	55
60～69	1,464	1,663	114	826	50
70～	587	718	122	364	51
計（全年代）	8,686	9,893	114	5,579	56
計（30歳以上）	8,686	9,893	114	5,018	51
年代	平成15年度初回受診者数（人）	平成16年度初回受診者数（人）	対前年度比（%）	平成17年度初回受診者数（人）	対前年度比（%）
～29	0	0	—	442	—
30～39	767	831	108	314	38
40～49	122	198	162	113	57
50～59	54	73	135	41	56
60～69	37	32	86	17	53
70～	33	50	152	22	44
計（全年代）	1,013（11.7%）注1)	1,184（12.0%）	117	949（17.0%）	80
計（30歳以上）	1,013（11.7%）注2)	1,184（12.0%）	117	507（10.1%）	43

*

注1）全受診者に対する全初回受診者の割合
注2）30歳以上の受診者に対する30歳以上の初回受診者の割合
*：p=0.0007

回受診者は1,753人で、30歳以上の初回受診者は779人であった。30歳以上の受診者に対して初回受診者の占める割合は、14.04％と前々年度（$\chi^2 = 25.649$、$p = 0.0007$）、前年度（$\chi^2 = 58.997$、$p < 0.0001$）より有意に増加していた。05年度のC市の20～29歳の受診者は1,211人で全受診者の17.90％を占め、受診率11.01％は全体の受診率より高かった。

図3に3市の2003～05年度の30歳以上の受診者に占める初回受診者の割合を示した。A市の03→04年度、B市の04→05年度の初回受診者の減少と、A、C市の04→05年度の初回受診者増加が目立った。

表4 C市の検診受診者および初回受診者の推移（前々、前年度の逐年検診との比較）

年代	平成15年度（逐年）受診者数（人）	平成16年度（逐年）受診者数（人）	対前年度比（%）	平成17年度（隔年）受診者数（人）	対前年度比（%）
～29	108	74	69	1,211	1,636
30～39	1,886	1,517	80	1,473	97
40～49	2,136	1,746	82	1,065	61
50～59	2,625	2,212	84	1,236	56
60～69	2,315	2,188	95	1,242	58
70～	956	718	75	536	75
計（全年代）	10,026	8,698	87	6,763	78
計（30歳以上）	9,918	8,624	87	5,552	64

年代	平成15年度初回受診者数（人）	平成16年度初回受診者数（人）	対前年度比（%）	平成17年度初回受診者数（人）	対前年度比（%）
～29	84	46	55	974	2,117
30～39	626	457	73	556	122
40～49	220	166	75	103	62
50～59	106	90	85	49	54
60～69	84	69	82	46	67
70～	61	66	108	25	38
計（全年代）	1,181（11.8%）注1)	894（10.3%）	76	1,753（25.9%）	196
計（30歳以上）	1,117（11.3%）注2)	848（9.8%）	76	779（14.0%）	92

＊

注1）全受診者に対する全初回受診者の割合　　＊：$p < 0.0001$
注2）30歳以上の受診者に対する30歳以上の初回受診者の割合

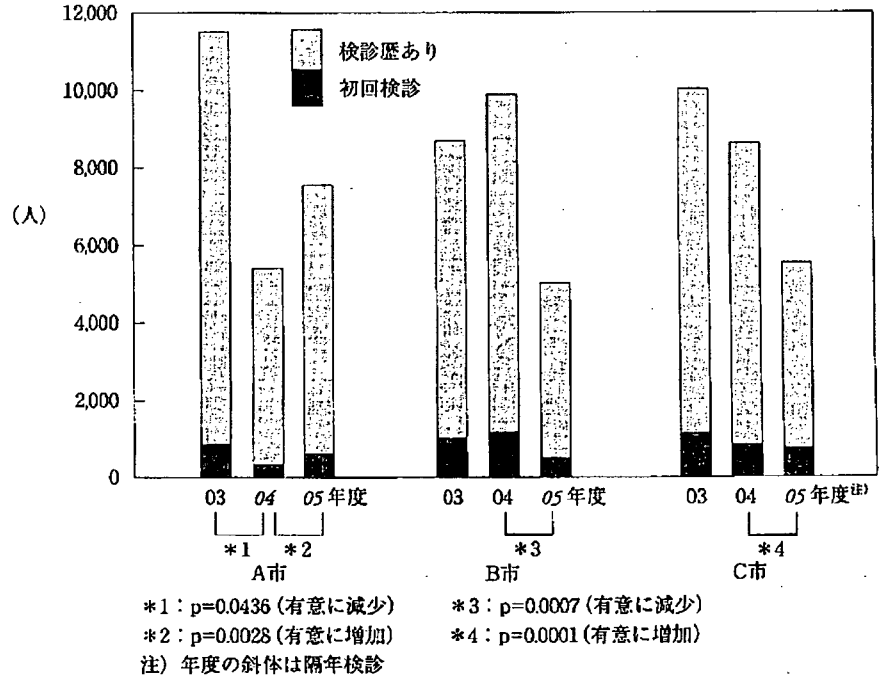

図3 三都市での30歳以上の子宮がん検診受診者数と初回受診者数

3. 考 察

1982（昭和57）年より老人保健法による子宮がん検診が国の正式な事業として法制化され、子宮がん死亡の減少に効果をあげてきた。子宮がん検診の評価は多くは有効との報告がなされている[7,8]。我が国でも2001年に「新たながん検診手法に関する有効性の評価」研究班が、子宮がん検診については30歳以上の女性を対象とした細胞診による子宮がん検診の死亡率減少効果を示す充分な効果があると報告している[9]。一方、検診を行う適切な対象年齢、受診間隔、さらに初回受診者を増加させるための検討を続ける必要があるとも追記している。04年には、がん予防重点健康教育およびがん検診実施のための指針（案）で「がん検診は、原則として同一人について年1回行うものとする。ただし、乳がん検診及び子宮がん検診については、原則として同一人に2年に1回行うものとする」との指針が提出された[1]。また、これまでの経緯として1998年の老人保健法の改正によりがん検診に対する国からの補助金が一般財源化された。

これによって、検診の実施は市町村の裁量に委ねられるかたちとなっていたが、実際は2003年までは福島県のほとんどの自治体で逐年検診が実施され、自治体間での検

診システムにはほとんど差がなかった。04年4月に検診実施のための指針(案)で隔年検診が提唱され、一部の自治体では検診年齢の20歳への引き下げとともに、受診対象者を当該年度に偶数年齢に達する者に限る隔年検診が実施された。さらに、05年度からは多くの自治体で隔年検診が実施されるようになった。隔年検診の普及によって03～05年度の受診状況がどのように変化したか明らかにした。受診率は、A市で9.58～13.19%、B市で6.80～7.59%、C市で6.91～9.95%であった。03年の全国の受診者が4,087,444人で受診率15.3%[10]や1975年の宮城県の87,763人、16.9%[11]に比してやや低いが、都市部は郡部より一般に受診率が低く、神奈川県の03年の199,885人、受診率9.5%[12]とほぼ同等である。

ところで、検診の効率化には検診未受診の初回受診者の掘り起こしが必須である[13,14]。隔年検診で検診対象人口が半減することや、年齢の引き下げで20歳代の初回受診者は当然増加するので、全体の初回受診率を前年と比較することは難しい。そこで、以前より検診対象であった30歳以上の受診者のなかで、初回受診者の割合を比較することで、検診の普及度や効率化を検討した。

A市では、2004年度から20歳以上の隔年検診となり、30歳以上の受診者に占める初回受診の割合が前年の7.2%から6.5%と有意に減少した($p = 0.0436$)。隔年化によって、検診を受けようと思った未受診者が、当該年に当たらず受診できないということが想定される。検診の効率を上げるためには、未受診者の掘り起しが必要である。そこで、A市では05年度は前年受診ができなかった当該年度に奇数年齢に達する女性にも受診を認めることとした。この結果、初回受診率は04年度より有意に増加($p = 0.0028$)し、03年度と同等のレベルに回復した。これは前年度受診できなかった奇数年齢の初回受診者が受診可能となり、初回受診者の割合が増加したと考えられる。

B市では2005年度より20歳以上の隔年検診となり、当該年度に偶数年齢に達する者に受診を限定した。A市の03年から04年への制度変更と同様に、30歳以上に受診者に占める初回受診者の12.0%から10.1%へ有意に減少した($p = 0.0007$)。この減少は筆者らの報告[2]からもある程度予測でき、隔年化によって、検診を受けようと思った未受診者が、当該年に当たらず受診できないということが想定される。

一方、C市でも2005年度より20歳以上の隔年検診となり、当該年度に偶数年齢に達する者に受診を限定した。しかし、C市では30歳以上の受診者は半減せず、30歳以上の受診者に占める初回受診者の割合も前年の9.8%から14.0%と有意に増加した($p < 0.0001$)。また、20～29歳の受診者率は、11.01%で全体の受診率の9.95%より高かった。この要因を調査したところ、C市では従来の「市政だより」といった広報に加えて、20～39歳の偶数年齢の女性住民全員に受診票送付を行い受診を勧めていた。A市で同じ対象者に受診票を送付しているが、基本健康診査、子宮がん以外のがん検診といった40歳以上が受診対象となる検診と一緒の受診票で、20～39歳の子宮がん検診のみの検診対象者にはわかりづらく受診票送付の効果が得られなかったと考えられた。C市の20～30歳代の検診対象者に子宮がん検診のみに関する通知を行ったという活動が、20～39歳の受診者特に初回受診者の増加につながっていると考えられる。すなわち、通知によって検診の存在を知らなかった人々、特に若年者に子宮がん検診の存在を知らせたことが、初回受診者の増加に寄与したと考えられた。

隔年検診によって30歳以上の受診者に占める初回受診者の割合が減少し、検診効率の低下が懸念された。さらに、当該年度に偶数年齢に達す者に限るという画一的な検診では検診間隔の延長が懸念される。2年前に受診した人が当該年度に受診できなかった場合、次回の検診は2年後であり、前回検診より4年後の検診となる。検診間隔については、Clarkeらは、検診歴の無い人々のIb期以上の進行がんが発見される危険度を1.00とすると、1年、2年ごとの検診は、進行がんの危険度を0.21、0.27と有意に低下させるとしている[15]。Sasieniらも検診歴の無い人々のIb期以上の進行がんのリスクを1.00とすると、1.5年以内の検診で0.24に1.5～2.5年前の検診で0.33に低下させるが、3.5年以上の検診間隔では危険率が低下しないとしている[16]。IARCも未受診者に比較し1年以内の検診では15.3倍、2年ごとで11.9倍の進行がんへの予防効果があるとしている[17]。我が国でもMakinoらが1年、2年ごとの検診で進行がんのリスクを0.09、0.17倍に低下させるが、3年以上になると有意差がなくなると報告している[18]。前年に受診できなかった人々に限っては、当該年度に偶数年齢に達しなくても受診可能にする制度の運用が望まれる。A市ではこの制度を適用し、初回受診者の増加にもつながった。

がん検診に対する補助金の一般財源化によって、子宮がん検診の有用性の啓蒙や受診効率の向上に向けての広報活動といった部分は、各自治体の裁量に委ねられている。今回、隔年検診の普及により受診機会が減少し、特に初回受診者の減少が危惧された。2001年の研究班の提

言にも初回受診者を増加させるための検討を掲げているが、これに逆行するような結果が予測される。実際に逐年から隔年検診へ変更したA市の04年度、B市の05年度では30歳以上の受診者に占める初回受診者の割合が有意に減少した。ところが、05年度のA市、C市では前年度に比して30歳以上の受診者に占める初回受診者の割合が増加し検診効率が上昇したと考えられた。この要因としては、A市では当該年度に奇数年齢となる対象外であっても前年受診しなかった者に対しては受診を認めたこと、C市では検診対象者、特に20～39歳の対象者に、検診の存在を周知させるという、わかりやすい通知を行ったことにあると考えられた。

市町村の財政や人的資源の面からみて、子宮がん検診の隔年化により受診者を制限することはある程度やむを得ない。それとともに検診の効率化を図る必要がある。子宮がんの若年化に伴う検診対象年齢の20歳への引き下げは効率の面からも歓迎すべきである。しかし、一律の隔年化は初回受診者の減少や検診間隔の延長が懸念される。前年度未受診者は受診可能にするなど、柔軟な制度の運用と検診対象者への効果的な受診勧告が、検診効率を向上させ、医療費の抑制にもつながると考えられる。

4. 結　語

子宮がん検診の一律な隔年化で、奇数年齢者の検診機会の喪失、特に初回受診者の減少が危惧された。また、検診間隔の延長で、がん発見者のなかでの進行癌への予防効果が薄れるということも危惧される[2,15～18]。一方、前年度未受診の奇数年齢者には受診を可能にすること、そして検診の存在を特に若年の対象者に周知徹底することで、初回受診者を含めた検診受診者の増加が見込まれると考えられる。今後は、各自治体での広報のあり方や柔軟な検診制度の運用を切望する。

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要旨

子宮がん検診の隔年化に伴い、検診を初めて受けようとした人が、対象に当たらず受診できないという理由から、初回受診者の減少が危惧される。福島県の3市で、逐年と隔年検診の制度変遷に伴う年代別受診者数や初回受診率の変化を調査した。A市では、2004年度に隔年検診を実施し30歳以上の初回受診率が前年の7.3%から6.5%へ有意に減少した($p = 0.0436$)。05年度は、前年度未受診者にも受診を認める対象の拡大を行い、30歳以上の初回受診率は7.9%と前年より有意に増加した($p = 0.0028$)。05年度に隔年検診を導入し、広報を中心とした住民への通知を行ったB市では30歳以上の初回受診率は前年の12.0%に比して10.1%と有意に減少した($p = 0.0007$)。20～39歳の検診対象者に受診票を送付したC市は、05年度隔年検診を行ったが、20～39歳の受診者数が増加し、30歳以上の初回受診率も前年の9.8%から14.0%と有意の増加を認めた($p < 0.0001$)。

子宮がん検診の隔年化による初回受診率低下といった検診効率の低下を防ぐためには、各自治体による有効な受診勧告法の検討や、画一的な隔年検診でなく、検診制度の柔軟な運用を行うことが重要である。

キーワード:子宮がん検診、隔年検診、初回受診者

〔原　著〕

子宮がん施設検診の問題点

——検診受診者の利便性をはかるための検診の広域化と長期化——

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Problems with Mass Screening for Cervical Cancer at Medical Facilities

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要旨：子宮がん集団検診における施設検診は，多様な生活様式を有する現代女性にとって検診受診の機会が増加し，受診率の上昇が期待された。ところが施設検診の受診者の増加がみられず，検診効率の低下が懸念される。原因として，受診可能な施設や期間が限定され，受診者の利便性が図られず，受診を見送っている人々の存在が考えられる。子宮がん検診の実施要項は福島県では各市町村が設定している。各自治体別の施設検診の受診条件を明らかにし，受診者の利便性と受診率に関して検討した。

2005 年度に福島県の各自治体の，検診可能な施設の広域性と検診が可能な期間について調査し，受診率を比較した。検診が可能な施設を居住地内に限定した町村は 36 で，その検診対象人口は 94,419 人，受診者は 3,701 人，受診率は 3.92% にとどまった。これは，近隣の市町村でも受診可能とした 28 町村の対象人口 78,537 人で受診者が 5,094 人，受診率 6.49% に比して有意に低かった。受診可能期間が 1 月未満の 26 自治体の検診対象者が 60,626 人で受診者数は 2,847 人，受診率は 4.70%であった。可能期間を 1 月以上 4 月未満とした 34 自治体の対象者が 144,548 人で受診者 11,066 人，受診率 7.66%，4 月以上可能な 14 の自治体では対象者が 262,922 人で受診者 25,908 人，受診率は 9.85% であった。受診が長期に可能な自治体が受診率は有意に高かった。

福島県の一部の自治体では，受診可能な施設や期間の制限がある。制限のある自治体での受診率は，広域化，長期受診可能としている自治体に比して，有意に受診率が低かった。子宮がん集団検診の効率化，特に受診率の向上のためには受診可能な地域の広域化と期間の延長による「いつでも，どこでも受診できる」体制の確立が肝要である。

索引用語：子宮がん施設検診，受診率の向上，利便性，受診可能施設，受診可能期間

Abstract: Although mass screening has reduced the mortality from cervical cancer, the participation rate has not increased over this decade. To find the reason for this stagnation, we investigated how the cervical cancer mass screening at medical facilities is performed in the 90 municipalities in Fukushima Prefecture. With the exception of 10 urban areas as well as 16 towns and villages where cervical cancer mass screening is performed only on mobile screening buses, the 64 municipalities were divided into 2 groups: (1) 36 where the examinees are allowed to undergo the screening only in their own municipalities and (2) 28 where the examinees are allowed to undergo the screening in both their own and neighboring municipalities. In the 1st group, of 94,419 eligible women, 3,701 underwent the screening, with the participation rate 3.9%. In the 2nd, of 78,357 eligible women, 5,094 underwent the screening, with participation rate 6.5%. The difference was statistically significant. According to the screening period, 74 municipalities were divided into 3 groups: (1) 26 where the screening period is 1 month, (2) 34 where it is 4 months and (3) 14 where it is more than 4 months. In the 1st group, of the 60,626 eligible women, 2,847 underwent the screening, with participation rate 4.7%. In the 2nd group, of the 144,548 eligible women, 11,066 underwent the screening, with participation rate 7.7%. In the 3rd group, of the 262,922 eligible women, 25,908 underwent the screening, with the participation rate 9.9%. The differences were statistically significant. These findings show that the stagnation in the rate of participation in cervical cancer mass screening at medical facilities is due to limiting the screening to both local medical facilities and short periods. The rate will rise if the examinees are allowed to undergo the screening in wider areas during longer periods.

Key words: mass screening for cervical cancer, participation rate, screening in wide areas, screening during long periods

緒　　言

子宮がん集団（住民）検診は，車両検診と施設検診で実施されている[1]。前者は，検診台を搭載したバスに検診医を載せ各地に赴き地域住民の検診を行う。広域な県土に集落が点在し，医療機関の少ない地域では，住民が医療機関を受診することなく検診が受けられるということで，検診が開始された1970年代には子宮がん検診の普及に大きく貢献した。しかし，車両が住居地にやってくるのは1年に1～2度であり，実施日が限定され自由な選択が出来ない，地域住民が一斉に集まるのでプライバシーが保てないなどの欠点がある。後者の施設検診は，検診が可能と認定された医療機関へ，受診者が行き検診を受ける方式で，受診者が診療所や病院などの医療機関を選択できること，受診者の都合のよい日に受診が可能，プライバシーが保てるなどの利点がある。1980年より開始され，近年では，女性の社会進出や，生活様式の多様化などから，一律の車両検診から選択の余地のある施設検診へと受診者が移行する傾向がある[2]。

ところで，子宮がん検診の実施は市町村各自治体にゆだねられている。背景には1998年の老健法の改定でがん検診に対する国からの補助金の一般財源化がある。これにより子宮がん検診の実施に関して受診可能な施設の指定や，検診が可能な期間等を，各市町村が自由に設定できるようになった。福島県では，市町村各自治体が，車両検診，集団検診の実施条項を設定している。施設検診については，各自治体が医師会に委託し各医療機関で実施している。その際は，市及び郡医師会がひとつの単位となり，各医師会の所属医療機関が検診実施機関となることが多い。一部の自治体では，医師会単位でなく，特定の医療機関（主として公的機関）に検診実施を委託している。さらに，これらの検診実施機関で行われた検診の検体は，福島県保健衛生協会が収集し，検体検査，判定を行い，自治体を通じて検診受診者に通知を行っている。この方式により，受診者は結果確認のための再診が省略でき，検診実施機関は結果の通知や経過追跡等の業務から解放される。一方，福島県保健衛生協会で，全県下の集団検診の判定や指針決定，受診への通知やその後の経過追跡を行うことで，県内のいずれの地域でも一定レベルの検診やその後の経過追跡が行われている。更に，検診業務の集