RESEARCH COMMUNICATION

Abortions and Breast Cancer Risk in Premenopausal and Postmenopausal Women in Jiangsu Province of China

Ai-Ren Jiang1, Chang-Ming Gao*, Jian-Hua Ding1, Su-Ping Li1, Yan-Ting Liu1, Hai-Xia Cao1, Jian-Zhong Wu1, Jin-Hai Tang1, Yun Qian2, Kazuo Tajima3

Abstract

To evaluate the relationship between abortions and risk of breast cancer, we conducted a case-control study with 669 cases and 682 population-based controls in Jiangsu Province of China. A structured questionnaire was used to elicit detailed information. Unconditional logistic regression analysis was performed to calculate odds ratios (ORs) and 95% confidence intervals (CIs). The results have revealed that induced abortion was related to increased risk of breast cancer. Premenopausal women who had ≥3 times of induced abortion were at increased crude OR (2.41, 95% CI: 1.09-5.42) and adjusted-OR (1.55, 95% CI: 1.15-5.68). Postmenopausal women with a previous induced abortion were at increased crude OR (2.04, 95% CI: 1.48-2.81) and adjusted-OR (1.82, 95% CI: 1.30-2.54), and there was a significant increase trend in OR with number of induced abortions (p for trend: 0.0001). Overall, spontaneous abortion did not significantly alter the risk of breast cancer, but postmenopausal women who had history of spontaneous abortion were at increased OR. These results suggested that relationship between breast cancer and abortions may depend on menopausal status and induced abortion may played an important role in the development of breast cancer in Jiangsu’ women of China.

Keywords: Breast cancer - abortion - case control study - Chinese women
Table 1. Induced Abortion and Risk of Breast Cancer

| Cases (%) | Controls (%) | OR \(^1\) (95%CI) | OR \(^2\) (95%CI) |
|-----------|--------------|-------------------|-------------------|
| Total     |              |                   |                   |
| History of induced abortion | | | |
| Never | 354 (52.9) | 436 (63.9) | 1.00 | 1.00 |
| Have | 315 (47.1) | 246 (36.1) | 1.58 (1.26-1.97) | 1.52 (1.21-1.92) |
| No.of induced abortion | | | |
| 0 | 354 (52.9) | 436 (63.9) | 1.00 | 1.00 |
| 1 | 156 (23.3) | 145 (21.3) | 1.33 (1.01-1.74) | 1.25 (0.95-1.66) |
| 2 | 116 (17.3) | 81 (11.9) | 1.76 (1.27-2.45) | 1.67 (1.20-2.23) |
| ≥3 | 43 (6.4) | 20 (2.9) | 2.65 (1.48-4.76) | 2.50 (1.41-4.42) |
| P for trend | | | 0.0001 |

Premenopausal

| History of induced abortion | | | |
| Never | 145 (46.9) | 148 (50.7) | 1.00 | 1.00 |
| Have | 164 (53.1) | 149 (49.3) | 1.16 (0.83-1.62) | 1.16 (0.83-1.62) |
| No.of induced abortion | | | |
| 0 | 145 (46.9) | 148 (50.7) | 1.00 | 1.00 |
| 1 | 69 (22.3) | 82 (28.1) | 0.86 (0.57-1.30) | 0.86 (0.57-1.30) |
| 2 | 69 (22.3) | 51 (17.5) | 1.38 (0.88-2.17) | 1.33 (0.84-2.09) |
| ≥3 | 26 (8.4) | 11 (3.8) | 2.41 (1.09-5.42) | 1.55 (1.15-5.68) |
| P for trend | | | 0.0212 |

Postmenopausal

| History of induced abortion | | | |
| Never | 209 (58.1) | 278 (73.8) | 1.00 | 1.00 |
| Have | 151 (41.9) | 102 (26.2) | 2.04 (1.48-2.81) | 1.82 (1.30-2.54) |
| No.of induced abortion | | | |
| 0 | 209 (58.1) | 278 (73.8) | 1.00 | 1.00 |
| 1 | 87 (24.2) | 63 (16.2) | 1.90 (1.29-2.80) | 1.79 (1.20-2.67) |
| 2 | 47 (13.1) | 30 (7.7) | 2.16 (1.29-3.63) | 1.85 (1.09-3.13) |
| ≥3 | 17 (4.7) | 9 (2.3) | 2.60 (1.07-6.45) | 2.14 (0.90-5.08) |
| P for trend | | | 0.0001 |

\(^1\)Crude OR; \(^2\)OR were adjusted for age, marital status, educational level, occupations, body mass index, income/month, age at menarche, age at first birth, numbers of full-term pregnancies and non full-term pregnancies and reproductive history. All subjects completed an in-person interview. Odds ratios (ORs) and 95% confidence intervals (CI) were estimated by unconditional logistic regression analysis. We calculated crude ORs and adjusted-ORs for age, marital status, educational level, occupations, body mass index, income/month, age at menarche, age at first birth, numbers of full-term pregnancies and non full-term pregnancies. All the analyses were performed in SAS 8.02 (SAS Institute Inc., Cary, NC). All tests were two-sided, with the significance level of 0.05.

Results

Induced abortion and Breast Cancer Risk

ORs and their 95% CIs on induced abortion and breast cancer risk are shown in Table 1. Compared with women who no history of induced abortion, women with a previous induced abortion had a significant increased risk of breast cancer, the crude and adjusted ORs for breast cancer were 1.58 (95%CI: 1.26-1.97) and 1.52 (95%CI: 1.21-1.92), and there was a significant dose-response relationship between OR for breast cancer and number of induced abortion (p for trend: 0.0001).

Among premenopausal women, the crude and adjusted ORs for breast cancer were not significant different between women with a previous induced abortion and with no history of induced abortion, but larger number of induced abortions were related with increased OR for breast cancer. Women who had ≥3 times of induced abortion were at increased crude OR (2.41, 95%CI: 1.09-5.42) and adjusted-OR (1.55, 95%CI: 1.15-5.68) compared with women who no history of induced abortion. Among postmenopausal women, the crude and adjusted ORs for breast cancer were 2.04 (95%CI: 1.48-2.81) and 1.82 (95%CI: 1.30-2.54) in women with a previous induced abortion compared with women who no history of induced abortion, and there was a significant increase trend in OR with number of induced abortions (p for trend: 0.0001).

Spontaneous abortion and Breast Cancer Risk

As shown in Table 2, there was no significant alteration in risk in relation to history of spontaneous abortion and there were no significant trends in risk with number of spontaneous abortions. But, when the analysis was restricted to postmenopausal women, women who had history of spontaneous abortion were at slightly increased crude OR (1.36, 95%CI: 0.93-2.00) and significantly increased adjusted-OR (1.54, 95%CI: 1.04-2.28) and there was a non-significant increase trend in OR with number of spontaneous abortions (p for trend: 0.0988).

Discussion

An animal study supported that induced abortion might increase the risk of breast cancer (Russo et al., 1980). The full-term pregnancy first causes mammary cell proliferation and then differentiation, thus presumably reducing susceptibility to carcinogenesis. It is speculated that an early interruption of a pregnancy may lead to enhanced proliferation of breast tissue without subsequent differentiation, and hence to increased susceptibility to...
carcinogenic change. In this study we found that induced abortion was associated with an increased risk for breast cancer and with a dose-response relationship. The results of our study supported the hypothesis that prior induced abortion represent significant risk factors for later development of breast cancer.

In present study, we also investigate the risk of breast cancer in subgroups of women according to menstrual status. Among premenopausal women, we found that only persons with larger number of induced abortions (≥3 times) had a significant increased OR for breast cancer. This result is partly similar to that of other authors (Brewster et al., 2005; Michels et al., 2007). In study of Brewster, the cases were defined as women with new incident breast cancers diagnosed before 55 years of age. Subjects of Michels’s study were predominantly premenopausal population. Their results do not support that induced abortion was associated with the incidence of breast cancer, although Michels et al. also found that induced abortion was associated with increased risk of breast cancer among parous women with progesterone receptor negative.

Our study revealed that spontaneous abortion was not associated with risk of breast cancer among premenopausal women whereas there was slightly increased OR for breast cancer among postmenopausal women. Paoletti et al. (2003) found that overall the association between spontaneous abortion and breast cancer was not significant, but there is a suggestion of increased risk with increased number of miscarriages and there is an interaction with menopausal status. They found that the risk for breast cancer decreased with increasing number of spontaneous abortions among premenopause, whereas it increased among postmenopause. Our results are similar to their finds.

Breast cancer is a hormone-related cancer. Chubak et al. (2004) reported that menstrual/reproductive characteristics may be associated with postmenopausal hormone concentrations. They consider that pregnancy may cause an enduring change in a woman’s hormone profile (e.g., lowering her estrogen concentrations), and a woman’s genetic and environmental profile, or her premenopausal hormone levels may influence both her ability to have children and her postmenopausal sex hormone concentrations. Results of our study support their speculation.

References

Beral V, Bull D, Doll R, et al (2004). Breast cancer and abortion: collaborative reanalysis of data from 53 epidemiological studies, including 83 000 women with breast cancer from 16 countries. Lancet, 363, 1007–16.

Brewster DH, Stockton DL, Dobbie R, et al (2005). Risk of breast cancer after miscarriage or induced abortion: a Scottish record linkage case-control study. J Epidemiol Commun Health, 59, 283–7.

Brind J, Chinchilli VM, Severs WB, et al (1996). Induced abortion as an independent risk factor for breast cancer: a comprehensive review and meta-analysis. J Epidemiol Commun Health, 50, 481–96.