

Reproductive Outcome of Yusho Women: Long Term Follow-Up Interviews

Takeda, R.^{1,2}, Ishida, D.², Yamamoto, K.²

¹Clinic Rei Takeda, 1-52-2, Honmachi, Shibuyaku, Tokyo, 151-0071 Japan

² Division of Environmental Medicine, University of Osaka, 2-2, Suita, Osaka, 565-0871, Japan

Abstract

To investigate the reproductive outcome of the Yusho women, we have compared the pregnancy outcome before and after the ingestion of contaminated rice oil. We have calculated live-birth ratio, spontaneous abortion ratio, and induced abortion ratio, and compared before and after the outbreak. The live-birth ratio declined ($p < 0.05$) after the outbreak. Spontaneous abortion ratio has increasing tendency ($p = 0.06$) after the outbreak. Legal induced abortion ratio increased ($p < 0.05$) after the outbreak.

Introduction

Yusho¹ is a mass food poisoning, occurred in western Japan and the cause was made public in Oct.1968. The cause is Kanemi (brand name) rice bran oil contaminated with heat-degraded PCBs. PCBs used as heat exchangers contaminated rice bran oil during processing. Later in 1971², the possibility was pointed out that Kanemi rice bran oil was also contaminated with dioxin family (PCDFs, PCDDs and so forth), because PCBs had been thermally degraded. This was confirmed in 1975³. The major cause for Yusho has been considered PCDFs.

In April 2004, Japan Federation of Bar Association began to investigate the infringement of human-right of Yusho victims (515 people) who had raised collectively a lawsuit against the nation and the companies that had produced and sold the toxic rice bran oil. In April 2006, Japan Federation of Bar Association presented a written advice for the nation and the companies to protect the human-right of Yusho victims. Now Diet members in all the parties are in motion toward a new law for helping victims. This study was held in compliance with the wishes of lawyers who conducted this matter: they wanted us to investigate "the condition of Yusho women's health".

Materials and Methods

The study enrolled 60 Yusho women (51 ever gravid), the year of birth from 1922 to 1994, who had declared suffering damage from toxicated oil and raised the lawsuit. Interviews were conducted with a questionnaire by medically trained investigators. All women were interviewed extensively about their general conditions of health and reproductive / pregnancy history: outcome of pregnancy (child-birth, spontaneous abortion, induced abortion and the year of birth or abortion), the condition of child-health, infertility, menstrual cycle duration and gynecological diseases (infertility, cancer of uterus, ovarian cancer, endometriosis, myoma, etc.).

About pregnancy outcome, we calculated birth ratio (number of live birth per pregnancy number), induced abortion ratio (number of induced abortions per 1000 live births) and spontaneous abortion ratio (number of spontaneous abortions per 1000 live births) and compared the ratios between before the outbreak of the accident and after the outbreak.

Results and Discussion

Live-birth ratio declined ($p < 0.05$) after 1967 (from 1967 through 2001) compared before 1967 (from 1943 through 1966); 88.2 to 61.3, $t(36) = 2.86, p < 0.05$ (fig1). Live birth ratio declined ($p < 0.05$) after 1968 (from 1968 through 2001); 87.6 to 60.7, $t(36) = 2.78, p < 0.05$ (fig2).

Spontaneous abortion ratio has increasing tendency ($p = 0.06$) after 1967 (from 1967 through 2001) as compared with before 1967 (from 1943 through 1966); 60.2 to 333.3, $t(21) = 1.98, p = 0.06$ (fig3).

Legal induced abortion ratio increased ($p < 0.05$) after 1967 (from 1967 through 2001), compared before 1967 (from 1943 through 1966); 36.3 to 275, $t(21) = 2.22, p < 0.05$. If we classify two groups before and after 1968, the difference becomes clearer. Legal induced abortion ratio increased ($p < 0.05$) after 1968 (from 1968 through 2001), compared before 1968 (from 1943 through 1967); 34.6 to 289.5, $t(21) = 2.27, p < 0.05$ (fig4).

It was reported in the newspaper that in 1968 in western Japan, a disease of unknown cause had broken out. Soon after that, it was cleared Yusho was caused by toxicated rice bran oil. The number of induced abortion has peak value in 1969. Induced abortion ratio (induced abortions per 1000 live birth) showed high level for five

years (from 1969 through 1973). This is due to the reduction in number of pregnancies, and increase in number of induced abortions. At the interviews we asked the reason of induced abortion. The answers were as follows; "I received advices of people around me", "I knew a neighbor who had given birth a black baby", "As I was in bad health, I could not bring up baby".

We have divided the groups before 1967 (from 1943 through 1966) and after 1967. We have also calculated the difference of live-birth ratio, spontaneous abortion ratio and legal induced-abortion ratio between two groups before 1968 (from 1943 through 1967) and after 1968. The difference of spontaneous abortion ratio between two groups is higher in 1967 classified groups than in 1968 classified groups. The officially announced date of manufacture of contaminated rice oil is Feb. 1968. Live birth, spontaneous abortion, and artificial abortion are all unforgettable events for women who experienced. But the women were recalling events that were years in the past at the time of interviews, so slight misunderstandings may have occurred. Another possibility may be that some facts lead to the onset of disease⁴ before 1968.

The legal artificial abortion ratio before the outbreak is very low compared with the mean legal artificial abortion ratio of Japan. The difference may be caused by the religion that believed by many victims. Many of the inhabitants of this district traditionally believe Christianity.

There are a number of limitations to our study. The women were interviewed years after the exposure, and the participants of this study are small in number. All the women belong to the parties litigant.

Further work should be done to clarify the fact.

Acknowledgement

We have no conflict of interest against Yusho victims and lawyers who conducted the matter.

References

1. Kuratsune M, In: *YUSHO*, Kuratsune M, Yoshimura H, Hori Y, Okumura M, Masuda Y. (ed.), Kyusyu University Press, 2000:3
2. Kuratsune M, In: *YUSHO*, Kuratsune M, Yoshimura H, Hori Y, Okumura M, Masuda Y. (ed.), Kyusyu University Press, 2000:36
3. Nagayama J, Masuda Y, Kuratsne M. *Fukuoka Acta Med* 1975;66:593
4. Shimoda M. *J. Endocrine Disruption* 2003;4:3

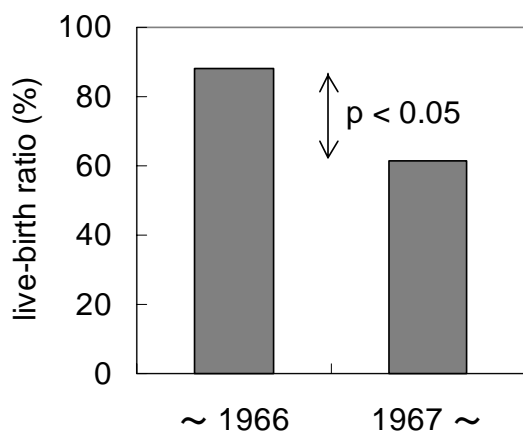


Fig.1 : Live-birth ratio also declined after 1967

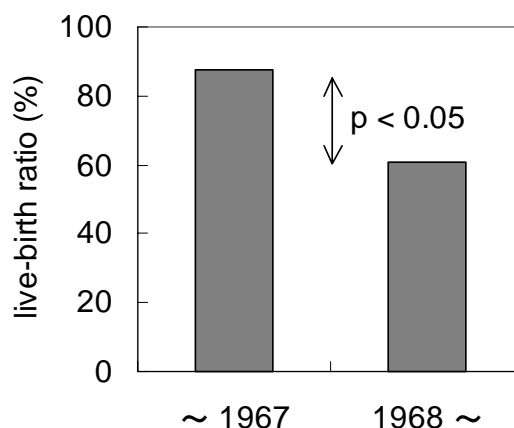


Fig.2 : Live-birth ratio declined ($p < 0.05$) after 1968

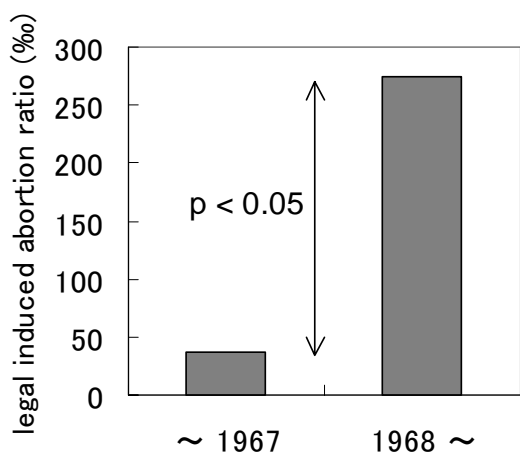


Fig.3 : Legal induced abortion ratio increased ($p < 0.05$) after 1968

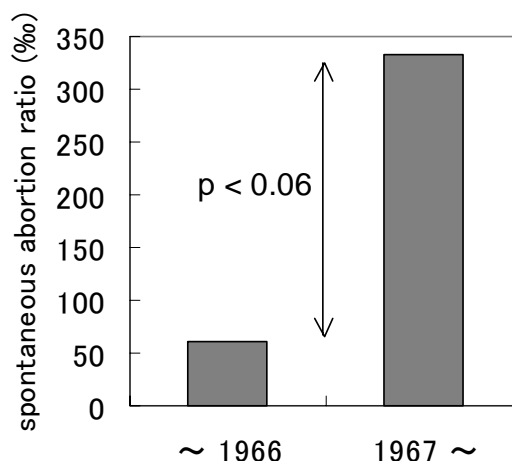


Fig.4 : Spontaneous abortion ratio increased tendency ($p < 0.06$) after 1967