Study on Fetomaternal Outcome in Long Interpregnancy Interval: Case Control Study

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Abstract: _Background: This study was carried out at a tertiary health centre with the aim of studying the effect of long interpregnancy interval on fetomaternaloutcome .The maternal complications and fetal complications of long interpregnancy interval were analysed in comparison to normal interpregnancy interval. Method: Case control study. 140 women with long interpregnancy interval seeking healthcare at tertiary health care centre were matched with 140 women with normal interpregnancy interval on the basis of demographic characteristics like age, height, weight and socio-economic status. These were included in the case control study. Results: Long interpregnancy interval is associated with increased risk of PIH and postdatism whereas normal interpregnancy interval is associated with increased risk of anemia as compared to long interpregnancy interval. The rate of cesarean section is significantly higher in women with normal interpregancy interval when compared to those with long interpregnancy interval. Conclusion: Long interpregnancy interval is associated with increased risk of PIH and postdatism whereas normal interpregnancy interval is associated with increased risk of anemia._

Keywords: Long interpregnancy interval, normal interpregnancy interval, Anemia, PIH, postdatism, Chi square test

1. Introduction

Pregnancy spacing refers to the practice of maintaining an interval between births of two or more years.

Interpregnancy Interval- It is defined as the period between delivery of previous infant and conception of current pregnancy.[1]

Optimal birth spacing is associated with multiple health and nutritional benefits for both mother and child and could play a significant role in helping countries achieve maternal and child health Millenium Development Goals.

Interpregnancy interval (IPI) is considered**long** if the span of time between a live birth and the start of a next pregnancy is more than or equal to five years [2]

After a live term birth, both the World Health Organization (WHO) and the United States Agency for International Development (USAID) recommend an IPI greater than 2 years and less than 5 years .[2]

A meta-analysis of 67 studies conducted in 62 countries as well as an additional study from Brazil, revealed that poor maternal and perinatal outcomes were associated with IPIs between 6 and 18 months or longer than 59 months. [3]

The female body goes through changes during pregnancy which can improve the capacity of uterus to promote growth of baby and to support the developing baby. These changes may regress over time and future pregnancy will no longer benefit from these changes. An interval of more than 4yrs does increase the risk of high blood pressure and hypertensive disorders of pregnancy such as pre-eclampsia.[4]

Very long gaps between births may result in maternal physiological regression i.e., risk for mothers (and infants) related to those associated with primiparous women [5]. This may explain why intervals greater than 59 months were associated with increased risk for eclampsia and pre-eclampsia[6].

In a study carried out by DeFranco, Muglia and Ehlrich in USA, [7]birth after estimated due date >40wks occurred less often in women with short IPI (16.9%) and 12 to 18 months (21.8%) compared with births following a normal IPI(23.1%).

Babies whose mothers had their previous child at least five years earlier had a 20% to 43% greater risk for being born prematurely, having a low birth weight or being small for their gestational age. [8]

The risk for preterm birth, low birth weight, and small size for gestational age increased by 1.9%, 3.3%, and 1.5%, respectively, each month that the time between pregnancies was shortened from 18 months. For each month between pregnancies longer than five years, the risk for these adverse outcomes increased by 0.6% to 0.9%.[9]

Thus long interpregnancy interval is associated with increased risk of PIH andpostdatism as compared to normal interpregnancy interval.

2. Methods

This study was carried out at our Tertiary care centre. 140 women with long interpregnancy interval and 140 women with normal interpregnancy interval were matched on the basis of demographic characteristics like age, height, weight and socio-economic status and selected and the pregnancy outcome along with maternal and fetal complications were studied.

Inclusion Criteria

All pregnant women with previous pregnancy, irrespective of outcome of pregnancy who attend the ANC clinic- booked, unbooked and referred at our Institute.

Exclusion Criteria

Primigravidas

2.1 Study population

All pregnant women with previous pregnancy, irrespective of outcome of pregnancy who attend the ANC clinic- booked, unbooked and referred at our Institute. The women were divided into two groups based on their interpregnancy interval (normal and long) and were matched on the basis of demographic characteristics.

2.2 Methodology

This is a case control study carried out at our tertiary care centre. Women were divided into two groups based on their interpregnancy interval (normal and long) and were matched on the basis of demographic characteristics. Pregnancy outcome- maternal and fetal were studied in both groups- women with normal and longinterpregnancy interval. The incidence of complications were studied in both groups.

2.3 Statistical analysis

For anemia, the Chi square statistic (df-1 and level of significance 0.05) was 6.9and P value was 0.0085, which is statistically significant. For postdatism, the Chi square statistic (df-1 and level of significance 0.05) was 5.52 and P value was 0.018, which is statistically significant. For PIH, the Chi square statistic (df-1 and level of significance 0.05) was 4.96 and P value was 0.025, which is statistically significant. However for Preterm labour, the Chi square statistic (df-1 and level of significance 0.05) was 1.77 and P value was 0.18, which is not statistically significant.

2.4 Study design

Case control study

3. Results

As shown in Table I, anemia was the most common complication, in both women with normal (58.5%) and long (42.8%) interpregnancy interval. Scar dehiscence and preterm labour were seen more commonly in women with normal interpregnancy interval whereas PIH was the second most common complication in women with long inter- pregnancy interval followed by postdatism.

1) **Distribution of cases as per maternal complication (Antenatal)**

Complication	No. of Cases	Percentage (%)	No. Of Cases	Percentage(%)	Chi sq. value	P value
	Normal ICP		Long ICP			
Anemia	82	58.57	60	42.85	6.9157	0.008544
PIH/PRE-Eclampsia	21	15	36	25.7	4.9563	0.025995
Preterm Labour	14	10	8	5.7	1.7759	0.182654
Post Datism	11	7.8	24	17.1	5.5184	0.018818
PROM	14	10	16	11.4	0.1493	0.699173
Scar Dehiscence	6	4.2	4	2.8	0.4148	0.519536
Malpresentation	6	4.2	8	5.7	0.3008	0.583411
Polyhydramnios	1	0.7	4	2.8	1.8327	0.175806
Oligohydramnios	7	5	5	3.5	0.3483	0.5551
GDM/DM	3	2.1	4	2.8	0.1465	0.701883
Placenta Previa/Acreta	2	1.4	4	2.8	0.6813	0.409151
Abruption	2	1.4	2	1.4	-	-

Chi square test was applied, at P-0.05, long ICP is associated with increased incidence of PIH, postdatism and PROM whereas normal ICP is associated with increased incidence of anemia, preterm and low birth weight. For anemia, the Chi square statistic (df-1 and level of significance 0.05) was 6.91 and P value was 0.008544, which is statistically significant. For PIH, the Chi square statistic (df-1 and level of significance 0.05) was 4.95 and P value was 0.025, which is statistically significant. For postdatism, the Chi square statistic (df-1 and level of significance 0.05) was 5.52 and P value was 0.018, which is statistically significant. The prevalence of other maternal complications was studied among women with long and normal interpregnancy interval, but the difference was not found to be statistically significant. As shown in Figure 1, lower segment cesarean section was seen more commonly in women with normal interpregnancy interval as compared to those with long interpregnancy interval. The Chi square statistic was found

to be 11.0208 and p value 0.000901. This difference was found to be statistically significant at p<0.05 and df-1.
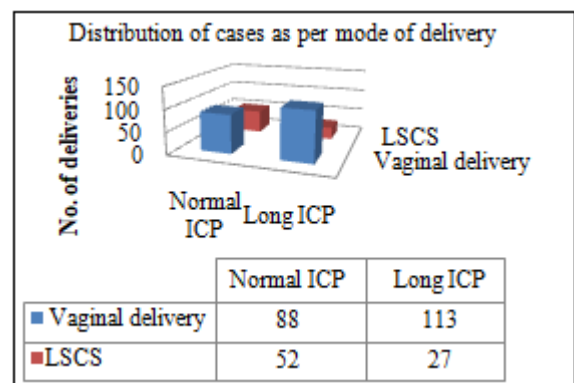

Figure 1: Distribution of cases as per mode of delivery

As shown in Table II, NICU admission and preterm infants were seen more commonly in women with normal interpregnancy interval than those of long interpregnancy interval.

2) Distribution of cases as per fetal outcome

Fetal Outcome	No. of Cases	Percentage (%)	No. of Cases	Percentage (%)
	Normal ICP		Long ICP	
Term	126	90	132	94.3
Preterm	14	10	8	5.7
NICU Admission	15	10.7	11	7.8

As shown in Figure 2, LBW and preterm were seen more commonly among women with normal interpregnancy interval. However for Preterm labour, the Chi square statistic (df-1 and level of significance 0.05) was 1.77 and P value was 0.18, which is not statistically significant. Similarly for low birth weight, the Chi square statistic (df-1 and level of significance 0.05) was 1.526 and P value was 0.216, which is not statistically significant.
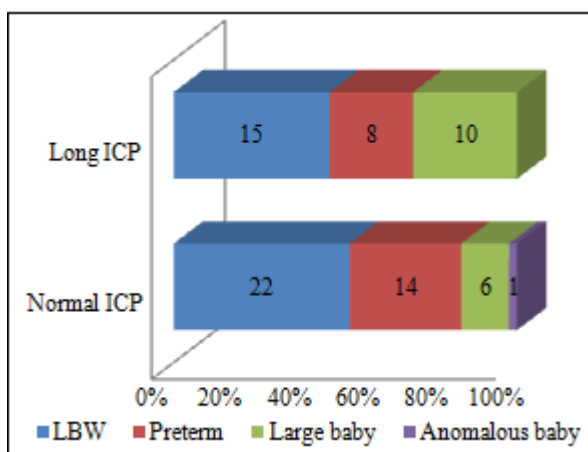

Figure 2: Distribution of cases as per fetal complication

As shown in Table III, among the NICU admissions, PROM (26.6%) was the commonest indication for admission among those with normal interpregnancy interval whereas large for gestational age baby (54.5%) was the most common indication for admission among those with long interpregnancy interval. Low birth weight babies had the maximum duration of stay in NICU and those with PROM and large for gestational babies had the minimum duration.

3) Reasons of NICU Admissions

Reason of NICU admission	No. of cases	Percentage	No. of cases	Percentage
	Normal ICP		Long ICP	
Respiratory distress	3	2.1	2	1.4
Hyperbilirubinemia	2	1.4	1	0.7
Low birth weight	3	2.1	2	1.4
PROM	4	2.8	-	-
Big baby	3	2.1	6	4.2

As shown in Table IV, majority of the cases had NICU stay of 3-7 days (60% of short ICP cases and 45.5% of long ICP cases. Least number of cases were seen in 0-3 days.

4) Duration of NICU admissions

	No. of cases	%	No. of cases	%
	Normal ICP		Long ICP	
0-3 days	1	0.7	1	0.7
3-7 days	9	6.4	5	3.5
7-14 days	3	2.1	4	2.8
>14 days	2	1.4	1	0.7

4. Discussion

All the characteristics and complications of women with long and normal interpregnancy interval were compared, however only the significant ones have been highlighted.

The estimated incidence of anemia among pregnant women in India is 50%(National Family Health Survey 2015-2016).In our study, as shown in Table 1, incidence of anemia was found to be 58.5% in women with normal interpregnancy interval which is significantly higher than the national average and 42.8% in women with long interpregnancy interval. (The results of this study cannot be applied to the general population as our tertiary health centre caters to a large number of referred cases)

Hypertensive disorders of pregnancy are associated with both short (<12 months) and long (>72 months) interpregnancy intervals.[10]Hypertensive disorders of pregnancy may complicate 3-10% of all pregnancies with variable incidence among different hospitals and countries.[13] In this study the incidence was 25.7 % in women with long interpregnancy interval and 15% in women with normal interpregnancy interval, establishing long interpregnancy interval as a risk factor for PIH.

In a study carried out in USA, [7]birth after estimated due date >40wks occurred less often in women with short IPI (16.9%) and 12 to 18 months (21.8%) compared with births following a normal IPI(23.1%). In our study, as shown in Table 1, 17% patients with long interpregnancy interval had postdatism whereas only 7% of those with normal interpregnancy interval had postdatism, establishing long ICP as a risk factor for postdatism.

Incidence of preterm labour was found to be 5.8 %[11] and between 7-9%[12] in various studies. In our study 10% patients with normal interpregnancy interval went into preterm labour. In contrast only 5.8% patients with long interpregnancy interval went into preterm labour, which is almost the same as the national average.

The prevalence of low birth weight in developing countries (16.5%) is twice than in developed regions(7%).[13]In this study 15.7% patients with normal interpregnancy interval delivered low birth weight baby whereas 10.7% patients with long interpregnancy had low birth weight babies as shown in Figure 2.

Hypertensive disorders and postdatism are seen more commonly in women with longinterpregnancy interval. On the other hand normal interpregnancy interval is associated with greater incidence of anemia, preterm labour, low birth weight babies as compared to long interpregnancy interval.

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