

# Histopathological Study of 209 Cases of Early Abortions

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## ABSTRACT

**Objective:** Determining the frequencies of various histological abnormalities of chorionic villi in cases of spontaneous abortions for better understanding of etiology and pathogenesis of the abortions.

**Study Design:** Cross sectional study

**Place & Duration:** This study was conducted at the Department of Pathology Dow Medical College, Dow University of Health Sciences (DUHS) Karachi from January 2009 to December 2010.

**Materials and Methods:** A total of 209 cases were included in this study from January 2009 to December 2010 and studied for the following variables e.g. age, date of last menstrual period (if given), period of amenorrhea (if available), history of previous abortions. This information was obtained from surgical pathological registers, request cards and copies of reports. The slides and paraffin blocks of cases coded as Abortions were collected from the files of Surgical Pathology of Department of Pathology Dow Medical College DUHS. The paraffin blocks were sectioned and stained with hematoxylin & eosin

**Results:** A total of 209 cases of Abortions were studied. In order to find the commonest age group of abortions, the maternal age of the patients were divided into 5 groups with less than 20 years to more than 35 years. Maximum numbers of abortions were encountered in maternal age group of 31-35 years with 85 cases (40.66%) and minimum number of abortions seen in maternal age of < 20 years with 16 cases (7.65%). Regarding the gestational period, it was provided in 117 cases. A maximum number of 45 cases (38.46%) were seen during 8-12 weeks of gestation and a minimum number of 10 cases (8.5%) were noted between 16-20 weeks. In the remaining 92 cases gestational period was assessed by estimation of presence / absence of nucleated RBCs in chorionic villi according to Salafia et al. Histological changes found in the chorionic villi were classified into 3 types according to Rushton's classification. This included hydropic change of the villi (type-I) fibrotic change (type-II) and normal honey combed appearance (type-III). Out of the 209 cases of abortions, 104 cases belonged to type-I, 81 cases classified as type-II and 24 cases as type-III.

**Conclusion:** It is of empirical value that products of conception should be studied in detail then just to confirm that pregnancy was established. This is of significant importance in patients with recurrent and habitual abortions, so as to establish a probable cause and to manage future pregnancies.

**Key Words:** Abortuses, Gestation, Products of Conception

## INTRODUCTION

Most pregnancies are lost in the early weeks than at any other stage of Gestation<sup>1</sup>. Three of the main early pregnancy loss are spontaneous abortion, ectopic pregnancy and hydatidiform mole<sup>2,3</sup>. Of the three, spontaneous pregnancy loss is the most common complication of early pregnancy<sup>4,5</sup>. Although early pregnancy loss is often considered to be less important than loss of the baby in later pregnancy, this attitude is inappropriate<sup>6</sup>. The loss of a wanted pregnancy is always distressful to the mother, irrespective of its timing and this is particularly true in cases of recurrent abortions<sup>7,8</sup>. Furthermore abortion, ectopic and molar pregnancies can have serious maternal consequences with appreciable risk of maternal mortality and long term morbidity<sup>9,10</sup>. Many studies have shown that 50% of spontaneous abortions occur because of chromosomal abnormalities in the conceptus<sup>11,12,13</sup>. If

the karyotype was abnormal the cause for that pregnancy loss is then known. Alternatively if the karyotype was normal, investigation of possible maternal factors could be initiated<sup>14</sup>.

This study was done to determine the various histopathological changes in early pregnancy loss. These changes can provide a baseline in reaching to the etiology and management of future pregnancies.

## MATERIALS AND METHODS

A total of 209 cases of abortions, were included in the study from Jan 2009 to Dec 2010 at the Department of Pathology Dow Medical College DUHS Karachi. The following variables were also included e.g. patients age, date of last menstrual period (if give), period of amenorrhea (if available). The slides and paraffin blocks were collected. Paraffin blocks were sectioned and stained with H & E (Hematoxylin & Eosin).

## RESULTS

A total of 209 cases of Abortions reported at Department of Pathology Dow Medical College DUHS Karachi, from Jan 2009 to Dec 2010 were included and studied for the following criteria/features.

**Maternal Age:** The maternal age was divided into five groups with less than 20 years and more than 35 years. Maximum number of abortions were encountered in maternal age group between 31-35 years with 85 cases (40.66%) while a minimum in maternal age groups of less than 20 years, 16 cases (7.65%). (Table-1)

**Gestational Age:** In 117 cases gestational age was available which was divided into four groups with a difference of two weeks. A maximum number of 45 cases (38.46%) were encountered during 8-10 weeks of gestational age, while a minimum number of 10 cases (8.5%) were noted during more than 12 weeks of gestational age. (Table-2).

**Table No.1: Distribution of 209 abortuses according to various maternal age groups**

Age Group (Years)	Numbers of Abortuses	Percentage
<20	16	08
21-25	30	14
26-30	52	25
31-35	85	41
>35	26	12
Total	209	100

**Table No.2: Distribution of 117 abortuses according to various gestational age groups**

Gestational Age (Weeks)	Numbers of Abortuses	Percentage
4 - 6	33	28
6 - 8	45	38
8 - 10	29	25
10 - 12	10	09
Total	117	100

In the remaining 92 cases, where gestational age was not available a possible estimation was done on presence / absence of nucleated RBCs within the chorionic villi. 20 cases were put in gestational age of less than 4 weeks, these consisted of empty villous vessels with no nucleated RBCs. 7 cases were in gestational age of 4-6 weeks with maximum number of nucleated RBCs. In 30 cases the gestational age was 6-8 weeks and percentage of nucleated RBCs dropped to 50%. In the remaining 35 cases gestational age was somewhere between 10-12 weeks with non-nucleated RBCs in the villous vessels. (Table-3) (Micro photograph-4)

**Histological Classification of Abortion:** The histological changes found in chorionic villi were

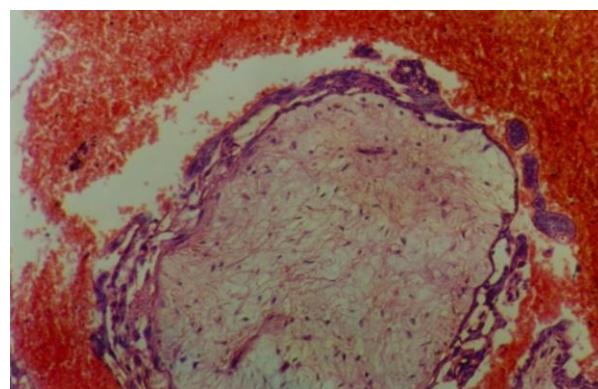
classified into three types according to Rushton classification (1978, 1981, 1987)

**Table No.3: Classification of 209 cases of abortions according to various histological changes of villi**

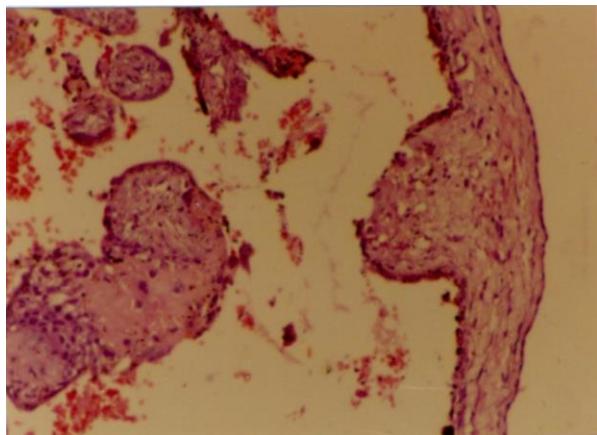
Classification	Microscopic Appearance of villi	No. of causes	%age
Type I	Hydropic +++	76	37
	Hydropic/honey	20	10
	combed++	10	05
	Hydropic/ fibrotic++	08	03
	Hydropic+		
Type II	fibrotic+++	45	21
	fibrotic++	15	07
	fibrotic/honey	09	04
	coomed+		
Type III	Honey combed +++	26	13
Total		209	100

**Table No.4: Estimation of gestational age on the presence / absence of nucleated RBCs in 92 cases where gestational age was not given**

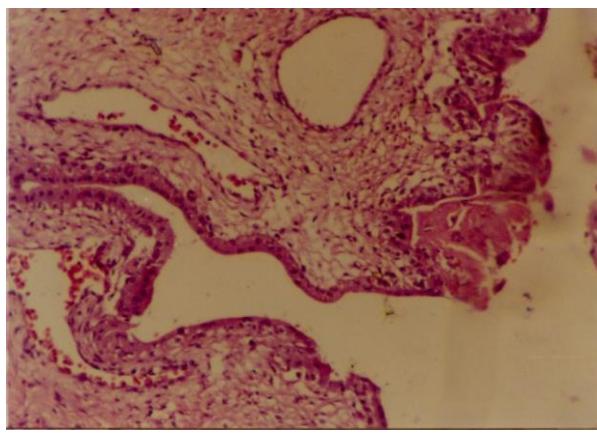
Approximate Age of Abortion Material (weeks)	Placental Features	Total No of cases	%age
4 - 6	Villous vessel empty of RBCs, stromal oedema	02	22
6 - 8	Nucleated RBCs abundant in villous vessels ,	07	08
8 - 10	Nucleated RBCs reduced to 50%	30	33
10 - 12	Proportion of nucleated RBCs decreases to 10%	35	37
Total		92	100



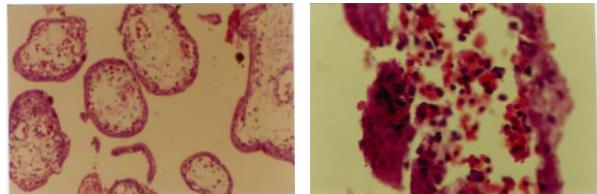
**Photomicrograph No.1: Showing placental tissue. A large hydropic villous. Surrounded by a large area of haemorrhage (H&E X100)**



**Photomicrograph No.2:** Showing membrane and chorionic villi. The villi reveal fibrosis.(H&E X 100)



**Photomicrograph No.3:** Blood vessels with nucleated RBCs (H&E X100)



**Photomicrograph No.4:** Showing many chorionic villi with reticular stroma and blood vessels. the blood vessels lumen contain nucleated RBCs (H&E X100)

**Type-I:** The first group was characterized by a hydropic change of the villi. The stroma of villi appeared edematous, stromal capillaries were decreased in number or absent and trophoblastic proliferation was present in some areas. Out of 209 cases 76(37%) were completely hydropic, 20 (10%) were partly hydropic and partly honey combed, 10 (5%) were partly hydropic and partly fibrotic and 8 (3%) showed some hydropic areas only.

**Type-II:** The second group showed villi with fibrotic changes, they were non-hydropic and stroma revealed neither cellular proliferation nor vascularity. These fibrotic changes affected either the whole villous or part of it. Out of 209 cases, 45 (21%) cases showed

complete fibrosis, 15 (7%) cases were partly fibrotic while 9 (4%) cases showed some fibrotic honey combed areas.

**Type-III:** The third group consisted of majority of villi which were non-hydropic and non-fibrotic, they showed normal honey combed villous stroma, and blood vessels. Out of 209 cases 26 (13%) were completely honey combed. (Microphotographs 1,2,3)

## DISCUSSION

The majority of pregnancies result in the birth of a healthy child with no complications<sup>15</sup> and some pregnancies end prematurely. A pregnancy loss at any stage can have serious implication on the expectant parents<sup>16</sup>. Early studies reported that about 2% pregnancies end in perinatal death after 28 weeks of gestation, while 10-25% recognized pregnancies end before 28 weeks<sup>17</sup>. Today an estimated 10-15% of all recognized early pregnancies end in unexpected loss<sup>18</sup>. First trimester pregnancy usually defined as the period from fertilization until 13th week of gestation, is the most sensitive time for the development of the conceptus. Therefore, there is a very high incidence of first trimester spontaneous abortions reported in literature<sup>19</sup>.

Recent advances in clinical obstetrics particularly the development of genetic counseling services and techniques for prenatal diagnosis have inevitably resulted in increased public awareness of the complication of early pregnancy and their causes<sup>20</sup>. The etiopathogenesis of abortions is diverse. Rushton in 1978 opined that abortions could be either due to a fault in the seed (i.e. fertilized ovum) or in the soil (uterine environment)<sup>21</sup>.

Although maternal exposure to certain teratogens and possible immune rejection of the conceptus does occur, the most common cause of first trimester spontaneous abortion is chromosomal abnormality<sup>22,23,24</sup>. The incidence of spontaneous abortions increase with an increase in maternal age. In the present study the maternal age of aborting women were seen most commonly between age group of 31-35 years (41%). This is slightly less than studies done in the western population, which showed an increase rate of abortions in women over 35 years of age<sup>25</sup>. An obvious age variation in this study could be explained by early marriages in our society, particularly in the lower socioeconomic group which makes these women more vulnerable to subsequent abortions. By the time they reach third decade of life they have had multiple pregnancies which super imposed by poor nutrition and anemia usually iron deficiency anemia may account for the increase number of abortions in this age group (i.e. 31-35 years). Severe anemia may have adverse effect on the mother and fetus, with spontaneous abortions and prematurity as its complication<sup>26</sup>. The older woman

is more prone to produce abnormal embryos and is susceptible to weak teratogens<sup>25</sup>. Various studies on the distribution of gestational age have concluded that most of the spontaneous abortions i.e. 80% occur in the early period. Fujikuara et.al in their study found 20 cases (46.7%) between 9-12 weeks<sup>27</sup>. Birbeck found maximum number of abortions 38% in 7-14 weeks<sup>28</sup>. Yet another study revealed 40.3% in between 8-12 weeks of gestation.<sup>29</sup> The distribution of gestational age in this study was in accordance to these previous studies. There was a maximum number of abortions 45 cases (38.46%) during 8-12 weeks of gestation.

In cases where gestational age was not given estimation was done by correlation of presence / absence of nucleated Red blood cells in the villous circulation<sup>30</sup>. Fetal nucleated red blood cells can be seen in microscopic sections of placenta. The percentage of nucleated to non-nucleated red blood cell can be calculated and used to estimate gestational age in placentas less than three months of gestation. The various studies done showed 100% nucleated red blood cells at 6 weeks ,the proportion of nucleated red blood cell decreases to10% at more than 12 weeks. Results of this study were in accordance with other studies<sup>31,32</sup>.

## CONCLUSION

Thorough histopathological examination of abortions is an integral and a routine component in evaluating etiology and management of patients with early pregnancy loss, recurrent abortions and future pregnancies. Appropriate genetic studies should go hand in hand with histopathological lesions. As 50% of all human ova have chromosomal abnormality with 99% mortality, making this type of defect as the commonest cause of early abortions. Literally thousands of newer techniques and research opportunities still await the investigator with a prepared mind to discover the hidden facts of abnormal development.

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