Chronic deciduitis: A possible attributing factor for preterm labor

Sudha V¹, C N Sai Shalini²*

¹Associate Professor, Department of Pathology, Saveetha Medical college, Saveetha Institute of Medical and Technical Sciences, Thandalam - 602 105, Tamil Nadu, India.
²Associate Professor, Department of Pathology, Sri Ramachandra Institute of Higher Education and Research, Chennai -116, Tamil Nadu, India.

*Corresponding Author
Name: Dr. CN Sai Shalini
Email: saishalini_cn14@yahoo.com
Contact: +91-9940217743

Abstract

Introduction:
Preterm labor is defined as birth before 37 weeks of completed pregnancy. Prematurity is one of the leading causes of perinatal morbidity and mortality. The pathogenesis of preterm labor is not completely understood but infection, inflammation or maternal antifetal rejection may play a role. Chronic deciduitis is diagnosed in the presence of lymphoplasmacytic inflammation in the decidua basalis. The criteria is to find plasma cells or diffuse and intense lymphocytes (>50/HPF) in the decidua. The aim of this study is to identify the possible role of chronic deciduitis and to determine its association with various other clinico pathological parameters in preterm labour.

Materials and methodology: This is a retrospective study of 300 patients with preterm delivery. Placentas of these patients were sent for histopathological examination to the Pathology department. The gestational age and indications for preterm delivery were retrieved from the Medical records. The study patients were divided into 3 groups, extremely preterm (< 28 weeks), early preterm (28 weeks to 32 weeks) and late preterm (32 -37 weeks). Placentas of greater than 37 weeks of gestation were excluded from the study. The placentas were assessed for acute and chronic maternal and fetal inflammation (chorioamnionitis, inflammation of the umbilical cord, villitis, and deciduitis). Results: We included 312 preterm placentas of which 136 had spontaneous preterm birth and 176 underwent indicated preterm births. Spontaneous preterm were more common among extremely preterm births. Chronic deciduitis was present in 26% of total 312 preterm placentas. Of this 31 % majority of cases fall in the gestational age group of 32 -37 weeks ( late preterm ) followed by less than 28 weeks (Extremely preterm ) of

gestation. Histological evidence of chronic deciduitis is more often seen in spontaneous preterm labour (31%) rather than maternal and fetal factors induced preterm labours. 28% of chronic deciduitis were also associated with preterm premature rupture of membrane. **Conclusion:** Preterm labor is one of the most common pregnancy related complications and has a tendency to recur in subsequent pregnancies. One of the main factors contributing to preterm labor is infection. This study suggests that chronic deciduitis may be associated with idiopathic preterm labor. Further extensive studies are needed to better elucidate pathogenetic mechanisms of chronic deciduitis in preterm labor.

Keywords: Preterm labor, infection, deciduitis

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**Introduction:**

Preterm is defined as a birth that occurs before 37 completed weeks (less than 259 days) of gestation. Preterm birth is the leading cause of perinatal morbidity and mortality. Complications of preterm birth is a challenge to health care facilities on a developing nation as ours because it associates with cerebral palsy and learning impairment. The incidence of preterm birth in India is 7-9%[1] and the rates are constantly rising. Around 15 million of babies are born prematurely, which is responsible for >50% of neonatal death[2]. It has traditionally been divided into spontaneous and indicated. On the basis of gestational age, it is further divided into extremely preterm (<28 weeks), early preterm (28-<32 weeks) and late preterm (32-<37 weeks)

Preterm labour can be due to multiple factors. The pathophysiology of preterm labor involves at least four primary pathogenic processes that result in a final common pathway ending in spontaneous preterm labor and delivery:

- Premature activation of the maternal or fetal hypothalamic-pituitary-adrenal axis
- Inflammation and infection
Decidual hemorrhage
Pathological uterine distention

Chronic inflammation is characterized by the infiltration of lymphocytes, plasma cells, and histiocytes (i.e., tissue macrophages). Chronic placental inflammatory lesions can be present in the villous tree, extraplacental chorioamniotic membranes, chorionic plate, and basal plate of the placenta. Evidence suggests that an immune process caused by maternal anti-fetal rejection plays a role in the pathogenesis of these conditions. Small number of chronic inflammatory cells are normally present in the decidual basal plate. Chronic deciduitis is diagnosed in the presence of lymphoplasmacytic inflammation in the decidua or, in the absence of plasma cells, the presence of diffuse and intense (>50/HPF) non-perivascular lymphocytic inflammation. A definite association between chronic deciduitis and preterm labor has not been previously established. The objective of this study was to examine the relationship between chronic deciduitis and idiopathic preterm labor among mothers who delivered at our tertiary care center.

Methods:

This is a retrospective analytical study composed of 312 preterm placentas received in the Pathology department of Sri Ramachandra Institute of Higher Education and Research for the period of 6 months between December 2019 and June 2020. All the placentas of less than 37 weeks of gestation were included in the study. The data like age of the mother, their gestational age of delivery, previous obstetric outcomes, indications for preterm labour were all obtained from the medical records. The placentas for which complete records were not available, were excluded, to minimise the bias. The slides were retrieved from the cabinet and reviewed for deciduitis as per the definition. Chronic deciduitis is diagnosed in the presence of lymphoplasmacytic inflammation in the decidua or, in the absence of plasma cells, the presence of diffuse and intense (>50/HPF) non-perivascular lymphocytic inflammation along with other features like other acute and chronic inflammatory lesions, infarctions, retroplacental hemorrhage and calcifications.

Result:

A total of 312 preterm placentas over a period of 6 months were analysed in our study. The maternal age ranges between 17 and 42. The mean age of preterm deliveries is 27.8
Table 1:

<table>
<thead>
<tr>
<th>Maternal Age</th>
<th>No. of preterm deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>15</td>
</tr>
<tr>
<td>21-25</td>
<td>71</td>
</tr>
<tr>
<td>26-30</td>
<td>43</td>
</tr>
<tr>
<td>31-35</td>
<td>166</td>
</tr>
<tr>
<td>36-42</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>312</td>
</tr>
</tbody>
</table>

Out of 312 preterm deliveries 107 were Extremely preterm, 61 were Early preterm and 144 were Late preterm deliveries.

The prevalence of histologic chronic deciduitis was found in 81 cases out of 312 (26%). In all cases of chronic deciduitis, the chronic inflammatory process was identified within the decidua basalis rather than the decidua parietalis. Deciduitis was found to be more common in late and extreme preterm placentas (31%) and...
less common in Early preterms (7%). The mean gestational age of placentas with chronic deciduitis was 30 weeks.

Table : 2

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Total no. of cases</th>
<th>Deciduitis</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely preterm</td>
<td>Less than 28 weeks</td>
<td>107</td>
<td>32</td>
</tr>
<tr>
<td>Early preterm</td>
<td>28 – 32 weeks</td>
<td>61</td>
<td>4</td>
</tr>
<tr>
<td>Late preterm</td>
<td>32 – 37 weeks</td>
<td>144</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>312</td>
<td>81</td>
</tr>
</tbody>
</table>

Preterm deliveries are more common among 31-35 years of age group. Chronic deciduitis is also more commonly seen in the same age group of mothers.

Table :3
Maternal Age | No. of preterm deliveries | No. of cases of Deciduitis
---|---|---
< 20 | 15 | 4
21-25 | 71 | 24
26-30 | 43 | 11
31-35 | 166 | 40
36-40 | 17 | 2
Total | 312 | 81

Other inflammatory conditions like acute chorioamnionitis was present in 29 cases and villitis of unknown etiology was in 8 cases and one case of funisitis and others had non specific findings. Most of the cases of acute chorioamnionitis were severe (grade 2/3 and stage 2/3) and only one of the placentas showed acute fetal inflammatory response as inflammation of the umbilical cord.

Concerning the relationship with chronic deciduitis, 14 had associated Acute chorioamnionitis which was more common in Extremely preterm placentas, 3 cases were associated with mild to moderate villitis and no case was associated with funisitis.

**Table : 4 Microscopic features in preterm placentas associated with deciduitis**

<table>
<thead>
<tr>
<th>Microscopy</th>
<th>Total preterms</th>
<th>Preterms with Deciduitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Chorioamnionitis</td>
<td>29</td>
<td>14</td>
</tr>
<tr>
<td>Villitis</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Funisitis</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Infarct &gt;30%</td>
<td>46</td>
<td>23</td>
</tr>
</tbody>
</table>

Other non inflammatory conditions like villous infarct of 20-30%, dystrophic calcification, perivillous fibrin deposition were present in most of the cases of deciduitis. 26 cases had massive perivillous fibrin deposition.
and 20 cases had infarct of more than 40%. Those cases were associated with conditions of poor uteroplacental perfusion like gestational hypertension, Diabetes mellitus.

PICTURES:

Figure 1: Chronic deciduitis

Figure 2: Acute chorioamnionitis

Figure 3: Placental infarct

Figure 4: Villitis and intervillositis
Of 312 preterm placentas, 139 underwent spontaneous deliveries, and 173 were medically induced for either fetal or maternal factors like anomalous babies, IUGR, and eclampsia respectively. 44 cases had history of preterm premature rupture of membrane.

**Table : 5 Clinical characteristics of preterm placentas with deciduitis**

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>Preterms</th>
<th>Deciduitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anomalous fetus</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>IUFD</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>PProm</td>
<td>44</td>
<td>23</td>
</tr>
<tr>
<td>IUGR</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Eclampsia</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Abruptio placenta</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>GDM</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>GHT</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Infections</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>IVF</td>
<td>13</td>
<td>9</td>
</tr>
</tbody>
</table>

Out of 81 cases of chronic deciduitis, 31 patients had spontaneous labour, 23 had PPROM, 23 had fetal causes for induction like anomalies and IUFD and IUGR, 19 had maternal factors like Abruptio, eclampsia, oligohydramnios etc and 9 had a history of IVF conception.

**Discussion:**

Preterm birth (PTB) refers to a delivery that occurs before 37 completed weeks of gestation. It may or may not be preceded by preterm labor. In our study late preterms (32-37 weeks) are more common. The possible reasons are improved risk assessment, more elective inductions and cesarean sections, increasing maternal age and increasing rates of multiple gestations.\[^{10}\] 44.5% percent of PTBs are spontaneous in nature due to preterm...
labor or preterm premature rupture of membranes rarely cervical insufficiency results in spontaneous PTB. The remaining percent of preterm births are medically induced due to maternal or fetal issues that jeopardize the health of the mother or fetus (eg, preeclampsia, placenta previa, abruptio placenta, fetal growth restriction, multiple gestation). WHO has reported an incidence of around 9-12% for preterm birth\cite{11}, India has an incidence of around 11% and shares two thirds of the global burden of preterm births.\cite{12}

Chronic inflammatory lesions have been less well characterized and studied than the more common acute inflammatory response to ascending infection in pregnancy. Chronic inflammatory infiltrates can be focal or multifocal, but there is no clear correlation between severity of inflammation and etiology or clinical outcome.

Chronic deciduitis is an infiltrate of plasma cells admixed with lymphocytes in the decidua. Chronic lymphoplasma cells in the basal plate are not specific to any one complication of pregnancy. It is commonly seen in severe Rh isoimmunization, antiphospholipid antibody-related pregnancy compromise, cytomegalovirus, herpes and syphilis, “treated” intra-amniotic bacterial infections and in preterm labors. So CD has been attributed to both infection and an alloimmune response.

In the present study, Chronic deciduitis was present in 81 (26%) of 312 preterm placentas. Few of these patients had histologic acute chorioamnionitis of various stages (14 cases) with PPROM, reflecting no demonstrable correlation between acute chorioamnionitis and chronic decidual inflammation and preterm labor.

Chronic deciduitis was thought to be present in 1–2% of all pregnancies, and to be associated with fetal growth restriction and fetal death\cite{13}. It is often a patchy lesion. In the basal plate, dense chronic decidual inflammation may accompany uteroplacental vascular lesions. Chronic uteroplacental vasculitis is significantly more common in pregnancy loss.\cite{14} The plasma cells sometimes may spill into the basal chorionic villi and cause chronic villitis.

Acute inflammatory lesions of the placenta are defined by the presence of diffuse infiltration of neutrophils at different sites of placentas like Amnion, chorion, villi or decidua. Acute chorioamnionitis is a feature of gestational age at birth. The frequency is higher in patients with spontaneous labor, preterm labor, clinical
chorioamnionitis (preterm or term), or ruptured membranes. Extensive studies emphasizes the importance of acute inflammation in early preterm deliveries and midtrimester spontaneous abortions.[15,16]

This analysis has only been intended to assess the mutual relationships of chronic deciduitis with acute chorioamnionitis and some of the clinical characters of preterm deliveries. The clinical associations of chronic deciduitis with these acute inflammatory conditions like are less well defined in our study but include intrauterine growth restriction, intrauterine fetal demise (IUFD), Preterm premature rupture of membranes and In vitro fertilizations.

**Conclusion:**

The etiology of idiopathic preterm labor and delivery is complex and undoubtedly cannot be explained by the presence of a single histologic entity. This study suggests that chronic deciduitis may be associated with idiopathic preterm labor but other patient factors, such as the maternal health, and fetal factors, also contribute to the etiology of preterm labor. Further studies are needed to better elucidate pathogenetic mechanisms of preterm labor and the potential role of chronic inflammation of the female genital tract.

**References:**


