Carbonic \textit{Anyhdrnse Activity in Amniotic: Fluid of Various Gestational Ages}

\textbf{DEĞİŞİK GEBELİK HAFTALARINDA AMNIOTİK SIVI KARBONİK ANHİDRAZ AKTİVİTESİ}

Selvin AYDIN*, Coşkun AYDIN-*, Nurten TURKOZAN*

* Departmen of Biochemistry, \textit{H}ıs \textit{t} diversity Parum \textit{of MeUırinc, A N K A R A}

** \textit{II. Maternity Hospital, Ministry of I lle,iih. A N K A R A}

\textbf{ABSTRACT}

Carbonic anhydrase enzyme activities of gravidas at various gestational ages have been measured. The increase between the first group (20-28 weeks of gestational age) and the second group (28-36 weeks of gestational age) was significant followed by a significant decrease towards term. Carbonic anhydrase activity can be used as an indicator of a number of anienated complications including respiratory distress syndrome because of its dour relation with secretion and the cells responsible for secretion especially surfactant producing type II pneumocytes.

\textbf{Key Words:} Carbonic anhydrase, Amniotic fluid

\textit{Anatolian J Gynecol Obst} 1991. \textit{I}: 101-109

\textbf{ÖZET}

Karbonik anhidraz aktivitesi değişik gebelik haf­
talarında ölçüldü. Birinci (20-28 gebelik haftası) ve ikinci günup (28-36 gebelik haftası) arasındaki artış hemen doğru anlamlı Müşüş izlemektedir. Karbonik anhidraz aktivitesi sekresvon ve sekresvondan sorum­
lu özellikle surfaktan üreten typ II pnmdosiler yakın ilişkisinden dolayı, respiratuvar distres sendromu daliii bir çok ailienat kompleksyonun tamında kullanılabılır.

\textbf{Anahtar Kelimeler:} Karbonik anhidraz, Amman mayii

\textit{TKlinImekolObst} IV91. i:ıii-ııı

\textbf{MATERIAL AND METHODS}

The first group consisted of 10 amniotic fluid samples obtained by transabdominal amniocentesis.
al 20-28 weeks of gestational age. The second group consisted of 14 samples obtained either by amniocentesis or vaginally from premature labour cases. Twenty-one term pregnancies formed the third group from whom amniotic fluid samples were obtained vaginally avoiding contamination of blood or meconium. Such samples were excluded.

Carbonic anhydrase determinations were performed by the esterase method proposed by Kopler an Armstrong (9,10). P-nitrophenyl acetate was prepared freshly at the time of assay (5.43 nig p-nitrophenyl acetate dissolved in 0.3 ml acetone and the volume completed to 10 ml by distilled water). One milliliter of p-nitrophenyl acetate was added to 1.8 ml of sodium phosphate buffer. With 0.02 ml of amniotic fluid sample, the readings were done at 348 Nm against blank (1.8 ml sodium phosphate buffer, 1 ml p-nitrophenyl acetate and 0.2 ml distilled water). For each sample, and the results were calculated in accordance with the amount of product formation by the enzyme in one minute (a = e.I. c). The results were given as units per gram protein. Protein determinations were done by Lowry method (11). Statistics were done with student's test.

**RESULT**

We observed a significant increase in carbonic anhydrase activity between our first and the second groups (p<0.05) while there was a significant decrease between the second and the third groups (p < 0.05) (Table 1 and 2).

<table>
<thead>
<tr>
<th>No of Samples</th>
<th>Mean</th>
<th>sld.dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>First group</td>
<td>10</td>
<td>7.44</td>
</tr>
<tr>
<td>Second group</td>
<td>14</td>
<td>16.67</td>
</tr>
<tr>
<td></td>
<td>(t = 5.09, p&lt; 0.05)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No of Samples</th>
<th>Mean</th>
<th>sld.dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second group</td>
<td>14</td>
<td>16.67</td>
</tr>
<tr>
<td>Third group</td>
<td>21</td>
<td>11.50</td>
</tr>
<tr>
<td></td>
<td>(t = 5.09, p&lt; 0.05)</td>
<td></td>
</tr>
</tbody>
</table>

**DISCUSSION**

In intrauterine life fetal lungs are full of fluid secreted by the lungs. In experimental studies it has been shown that the fluid has a high chloride and low bicarbonate content pointing out that carbonic anhydrase plays a significant role in this process (8). The existence of carbonic anhydrase enzyme in preterm fetal lungs has been shown by Berfenstram et al and later studies have revealed that this activity is in close relation with the fluid secretion and volume where it increases with the progress of pregnancy (6). This fact supports the role of carbonic anhydrase fluid secretion because in another study where carbonic anhydrase was inhibited by acetolamide fluid secretion of the lungs also decreased in a ratio of 04.5% and this was accompanied by a fall in chloride concentration (12).

It is obvious that amniotic fluid and lung fluid are in close relation with each other during pregnancy. It has been reported that type II pneumoeytes responsible for secretion increase in number with proceeding pregnancy (13). As this number increases it seems possible that the activity of the enzyme also increases with the number of the cells. Thus we have found the activity of first group significantly lower than the second group.

Significant decreases were observed between the second and the third groups. This fall could be due to the reduced amount of amniotic fluid towards term and there are also reports on the reduced number of secretory cells just before and after delivery. Thus decreases in carbonic anhydrase activity of amniotic fluid could be due to the decrease in the number of secretory cells.

We concluded that amniotic fluid carbonic anhydrase measurements could be a tool for several antenatal diagnoses especially if carried of with L/S, optical density and phosphatidyl glycerol determinations, because it's rapid, reliable and cheap as an antenatal diagnostic procedure.

**Kaynaklar**


TKlin Jinekol Obsi 1991, 1
AYHIN veArk.

**CARBONIC ANHYDRASE ACTIVITY IN AMNIOTIC FLUID OF VARIOUS GESTATIONAL AGES**


