A NEW SIMPLE TEST FOR DETECTING RUPTURE OF THE FETAL MEMBRANES

THESIS

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By

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

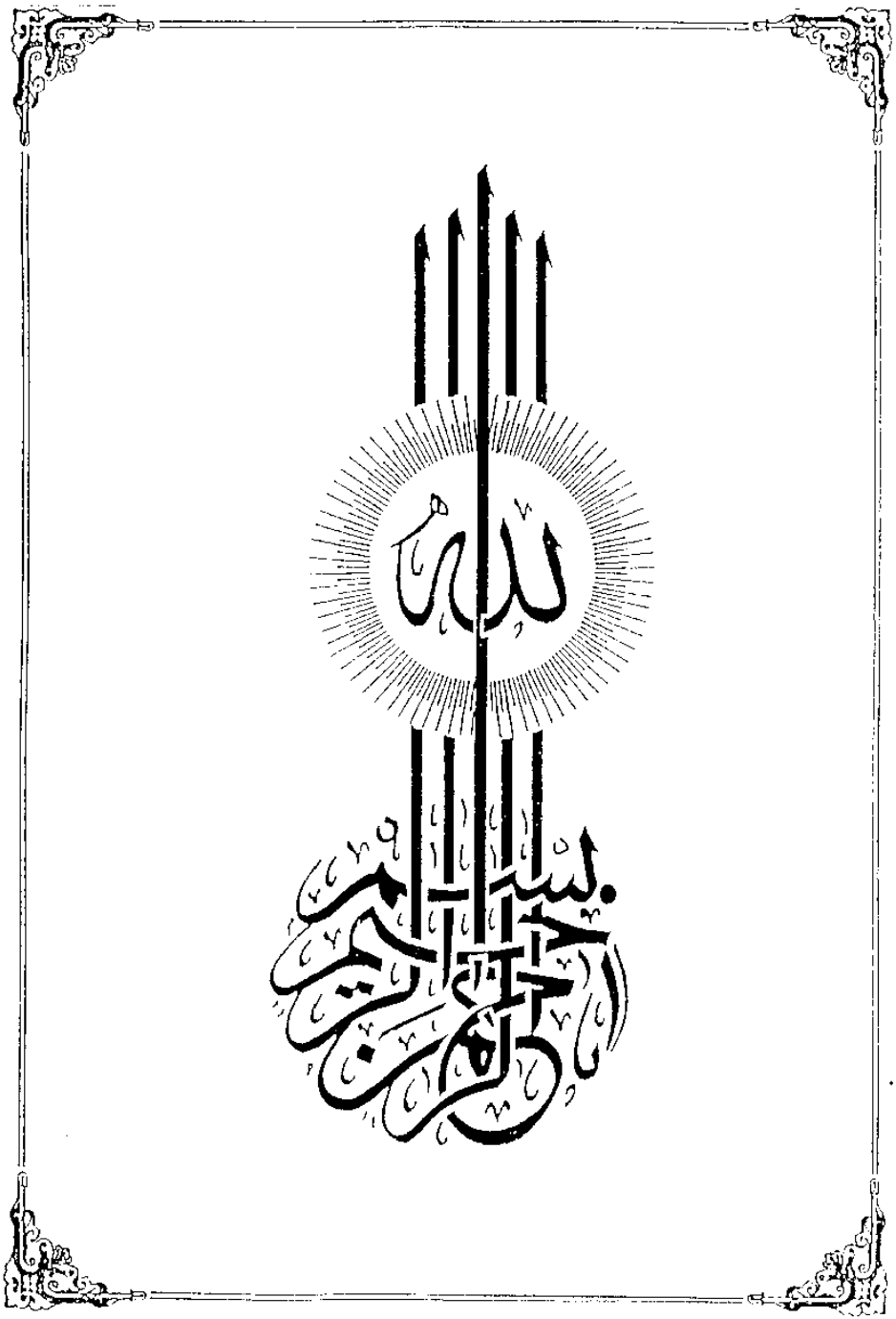
اللَّهُ الَّذِي خَلَقَكُمْ ثُمَّ رَزَقَكُمْ ثُمَّ يُمِيتُكُمْ

ثُمَّ يُحْيِيكُمْ . هَلْ مِنْ شُرَكَائِكُمْ مَنْ يَفْعَلُ مِنْ

ذَلِكُمْ مِنْ شَيْءٍ ، سُبْحَانَهُ وَتَعَالَى عَمَّا يُشْرِكُونَ

صَدَقَ اللَّهُ الْعَظِيمُ

الآية ٤٠ - سورة الروم



DEDICATED .....

TO .....

The spirit of my beloved **FATHER**

AND .....

My **MOTHER**

My WIFE **"EMAN"**

And

My KIDS....

"AHD".....

"MOAMEN ..

"SHEHAB"...

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CONTENTS

	Page
* INTRODUCTION AND AIM OF THE WORK	1
* REVIEW OF LITERATURE	4
- Diagnosis of premature rutpure of the fetal membranes	4
- Anatomy of the fetal membranes	40
- The histological and the ultrastructerial studies of the amnion	46
- Physical properties of the fetal membranes	51
- Physiology of the amniotic fluid and fetal membranes	58
- Factors that predispose to premature rupture of the fetal membranes	62
- Complications of premature rupture of the fetal membranes	70
- Management of the premature rupture of membranes	86
- The cervical mucus	110
* SUBJECTS AND METHODS	119
* RESULTS	123
* DISCUSSION	138
* SUMMARY AND CONCLUSION	143
* REFERENCES	150
* ARABIC SUMMARY	

INTRODUCTION AND AIM OF THE WORK

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Premature rupture of the membranes (PROM) in preterm gestations occurs in approximately 1% of all pregnancies (Gibbs & Blanco, 1982), and is often the initiating event leading to preterm birth, which is associated with high rates of neonatal morbidity and mortality (Arne et al., 1989).

The diagnosis of PROM is an important factor in the management of obstetric patient (David, 1962),

Obstetricians face a well known dilemma when clinical diagnosis of ruptured fetal membranes is inconclusive and confirmatory tests must be used (Baptisti, 1938 and Roger, 1976).

Presented is a new technique for the diagnosis of ruptured fetal membranes. The interpretation of the technique proposed is based on the color obtained after material collected from the endocervical canal is heated (Odilon et al., 1984).

The accuracy of the most commonly used tests for ruptured membranes (nile blue, vaginal pH, crystallization and nitrazine) have positive and negative predictive values of approximately 95 to 98% and false positive and negative results varying between 0 and 10% (Abe, Tom, 1940; Volet and Morier, 1960; David, 1962; Tricomi et al.,

1966 and Roger et al., 1976).

The new technique proposed here has proved to be practical, risk free, low-cost and easy to carry out (Odilon et al., 1984). PROM is a major obstetric emergency which should be approached with absolute care to avoid maternal and perinatal mortality and complications. Now it is well established that the standard definition of PROM is "the disruption of the amnion and the chorion with resultant leakage of amniotic fluid prior to the onset of labor. While the term "Preterm", will refer to pregnancy with gestational age less than 37 weeks of amenorrhea, calculated from the first day of last menstrual period.

Inspite of a remarkable tendency of PROM to recurr in successive pregnancies, with many published theories about its genesis, the etiological factors are not well defined with certainty and the data available are still contradictory. Logically, studies on physical properties of the membranes should provide a key to the etiology of PROM. However, it is claimed that membrane rupture is not the result of inherent weakness, in as much as membranes will withstand pressures that exceed those resulting from contractions of labor. However, Skinner in 1981, claimed that premature decrease of collagen content of membranes may have a role.

In the last decade, algorithms for managing PROM before term have been complicated by new regimes of management : e.g.

glucocorticoids to enhance lung maturity, tocolytics, and amniocentesis. At the same time, there has been heartening improvement in the survival of premature infants (Gibbs & Blanco, 1982).

Aim of the study :

Is to establish a new simple test depending on the color changes of the amniotic fluid beside the other biochemical and histochemical tests used for diagnosing the prematurely ruptured membranes, to investigate all the different opinions and the confilicting data as regards the etiology, diagnosis and complications of preterm PROM and also the data as regard the cervical mucus changes during the cycle.

REVIEW OF LITERATURE

Historical review :

Gold et al. (1927), puplished a method based on the change in vaginal pH from acid to alkaline with litmus used as an indicator.

Baptisti et al. (1938) and Abe, Tom et al. (1940) introduced a nitrazine indicator which was more stable and provided excellent results over a more narrow pH range. This method has been widely used and continues unchanged to the present except for the simplification provided by nitrazine paper.

Phillipp, (1929) described the first microscopic technique for identifiction of the fetal lanugo hairs in amniotic fluid, however, since the hairs are present in such scant quantity, this method has never achieved universal acceptance.

Von Numers , (1936) reported that fetal fat particles which had become detached from the vernix caseosa and were free in the amniotic fluid stained readily with sudan III.

Paavola , (1958), contended that this test is very accurate at term but ineffectual before the seventh month of gestation.

Brosens and Gordon (1965), discovered that the neutral lipid in fetal desquamated epithelial cells accepts an orange stain as a consequence of the oxazone present in commercial Nile Blue Sulfate. Unfortunately, these cells are not present in sufficient quantity before the thirty-second week of gestation to provide a valid test of rupture of the membranes, hence the usefullness of this test is limited to the last

REVIEW OF LITERATURE

DIAGNOSIS OF RUPTURED FETAL MEMBRANES

Premature rupture of the fetal membranes (Spontaneous rupture of the membranes one hour or more before the onset of labor at term or earlier) occurs in 6.6 to 13.9 percent of all patients and is followed by spontaneous labor within 48 hours in 70 to 90 percent of cases. (Sacks et al., 1967).

It is highly desirable to establish a definite diagnosis of ruptured membranes in uncertain cases without delay, if possible, by the most simple and accurate methods available. (McCaffrey et al., 1966).

Indeed, over the years, many methods and tests have been developed none wholly satisfactory. The development of these tests has followed four different but related lines :

1. Study of changes in vaginal pH.
2. Staining techniques for the identification of fetal fat globules within or outside fetal cells.
3. The cytologic identification of fetal squamous cells.
4. Recognition of the crystallization pattern of amniotic fluid. (Micheal et al., 1969).

2 months of pregnancy. Although fetal cells had been previously identified in amniotic fluid, it was **Bourgeois**, (1942)who utilized a Masson trichome stain for their precise identification.

Goldfine (1955), using a modified Papanicolaou stain, described the staining characteristics and morphology of fetal cells before and after rupture of the membranes.

Hopman et al. (1957) described the morphology of the vernix caseosa cells.

In **(1963) Averette et al.**, observed that the polygon-shaped fetal squamous cells stained a translucent blue-white with pinacyanole chlorid stain and were quite distinct from vaginal cells.

Kushner et al. (1964) using the 10 seconds acridine orange flourescent stain of observed with ultraviolet microscopy that the anucleate fetal squamous cells stained green or reddish green and possessed a distinct morphology.

Kardos and Tamasi, (1955) described the typical crystallization pattern of amniotic fluid created primarily by the sodium chloride and protein content. The conditions under which amniotic fluid crystallizes and the differentiation from cervical mucus and other substances which crystallize were presented by **(Neuhans and Moghissi, 1962).**

An interesting concept to be in mind is the "two sac" theory of rupture of the membranes proposed by **Schuman et al. (1951).** He

stated that amniotic fluid can and does dissect between the two layers of the membranes, producing a bulge containing as much as 500 c.c. of fluid which may then rupture into the vagina, leaving behind one intact layer with the remainder of the fluid enclosed, hence, the patient often gives a definite history of a gush of fluid per vaginam, the clinical tests are all positive (depending on the time the specimen is obtained), but the membranes are clinically intact at delivery.

In most instances, rupture of the amniochorial membranes can be diagnosed by the gross evidence of amniotic fluid in the vagina. There are, however, not a few instances in which the status of the fetal membranes is in doubt and clinical examination does not afford the answer. (Tricomi et al., 1966).

PROM with a prolonged interval to the onset of labor can be of significant importance to both mother and fetus. A not infrequent complication is the development of intrauterine infection which greatly jeopardizes the fetus' prognosis for survival and increases maternal morbidity. Consequently, it is important to establish with certainty whether the membranes are intact so that, when necessary, the proper therapeutic regimen may be instituted. (Tricomi et al., 1966).

Several methods have been developed to establish the presence of ruptured membranes. The commonest and perhaps oldest approach has been the determination of the pH of the vaginal fluid. (Abe, Tom, et al., 1940).