The association of C-reactive protein in the pathogenesis of meconium stained amniotic fluid in Al- Najaf city

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Abstract

The objectives of this study is to study the association of C-reactive protein in the pathogenesis of meconium stained amniotic fluid in women presented in labour. A case control study, 90 women presented in labour 45 with meconium stained amniotic fluid (MSAF) and 45 clear amniotic fluid (CAF), from March 2013 to July 2013 in the labour room and operative theater. Data collected regarding their age, gestational age, mode of delivery, neonatal outcome, parity and maternal blood for C- reactive protein. Complete physical examination of the neonate regarding Apgar score, color of baby, response to a catheter in the nostril, muscle tone, heart rate and breathing was done. There was a significant increment in the level of C- reactive protein in women with MSAF. We concluded that C- reactive protein may be involved in the pathogenesis of MSAF.

Keywords: C-reactive protein, MSAF, CAF

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Introduction

Meconium is a common finding in amniotic fluid and placental specimens, particularly in the term or post-term pregnancy [1]. Although its presence has been considered a sign of fetal maturity, some evidence suggests that it may also represent a response of the fetal gastrointestinal tract to pathologic conditions, such as acute or chronic hypoxia. The cause of meconium stained amniotic fluid in term healthy pregnancies is not clearly understood Yet [2]. Intra uterine meconium passage in near term or term fetuses has been associated with feto-maternal stress factors and/or infections. The meconium staining of amniotic fluid occurs in 12% of all live births per annuum. Aspiration of meconium that occurs during intra uterine life or after delivery with the first few breaths may result in or contribute to respiratory pathology known as meconium aspiration syndrome (MAS) which represents a leading cause of

the perinatal morbidity, occurring in 5-20% of all babies born through MSAF [3].

C-reactive protein (CRP) is a sensitive marker of systemic inflammation and is primarily synthesized in hepatocytes in response to infection and tissue injury [4], and are associated with periodontal disease, a chronic bacterial infection associated with elevation of proinflammatory cytokines and prostaglandins. CRP has been associated with adverse pregnancy outcomes, including preterm delivery, preeclampsia, and intrauterine growth restriction [5]. In this paper we want to study the role of CRP as an aid in the diagnoses of subclinical infection in pregnant women who experience meconium stained amniotic fluid.

Patient and methods

A case control study of 90 cases of a women presented in labor who had meconium stained amniotic fluid & those with clear amniotic fluid it was carried out between March 2013 to July 2013 in the labour room and operative theater in Al-Zahraa teaching hospital in Al-Najaf city. During study cases keeping in mind the inclusion and exclusion criteria. A written consent was obtained from all qualified pregnant women volunteers after explaining the purpose of the study and the confidentiality of collected date and results.

Inclusion criteria

All pregnant women in labour with cephalic presentation, singleton pregnancy, with clear or meconium stained liquor irrespective of age, parity and stage of labour. Artificial rupture of membranes or spontaneous rupture of membranes, those with previous normal deliveries or previous lower section caesarean section.

Exclusion criteria

The presence of any sort of infection, mal-presentation, multiple pregnancies, pre maternal medical diseases, fetal malformation, intrauterine fetal demise and post-term pregnancy.

Biochemical investigation

Blood samples was collected from participating women for complete blood picture, blood sugar, renal and liver function test and serum for C-reactive protein.

The C-reactive protein done by taken blood sample and centrifuge done to it and then the serum isolated from the sample and put it in a kit of Ag-Ab complex, if hemo-aglutination acour (micro clot formation) the result is positive and if hemoaglutination not acour the result is negative, the result depends on dilution factors for example 6, 12, 24, 48, 96… etc. the sample of blood storage should be not exceeding 2-3 days.

Statistical analysis

Statistical analysis was done by using SPSS (statistical package for social sciences version 20). In which we use independent sample T-test for measurement data and chi square(X2) test for categorical data. We set P value <0.05 as significant.

Results

The result of our study was consist of 45 women with meconium stained amniotic fluid and 45 clear amniotic fluids. The comparison of certain parameters between the two groups were shown in table 1.

In table 1 and 2 there is no significant difference between the two groups regarding age, parity, gestational age, fetal heart, SGOT, SGPT, B. urea, serum creatinine, except the mode of delivery where most of women with MSAF delivered by C/S (P<0.05). In table 3 there is significant

elevation in the level of C-RP in women with MSAF.

Characteristic	Meconium stained AF	Clear AF	P value
	Mean ±SD	Mean ±SD	
Age (years)	25.8±4.14	26.13±3.92	0.983
Parity	0.911±1.7	0.777±0.849	0.646
Mode of delivery (C/S)	36(58.1%)	26(41.9%)	0.023
Weight of baby (kg)	3.01±0.42	3.24±0.61	0.082
Fetal heart (b/min)	145.8±6	146.044±4.7	0.856

Table 1.
comparison between MSAF and clear AF with certain characteristics.

Parameter	Meconium stained AF N=45	Clear AF N=45	P value
	Mean ±SD	Mean ±SD	
GOT(U/L)	22.33±4.07	23.97±5.65	0.117
GPT(U/L)	25.04±5.77	27.3±8.89	0.541
B. urea (mg/dl)	22.6±4.78	24.3±6.81	0.758
Serum creatinine (mg/dl)	0.71±0.22	0.72±0.31	0.919

Table 2.
Comparison between meconium stained and clear amniotic fluid groups regarding biochemical tests.

Parameter	Meconium stained AF N=45	Clear AF N=45	P value
	Mean ±SD	Mean ±SD	
CRP (mg/L)	23.4667±16.75	11.9111± 9.94	0.025

Table 3.
Treatment outcomes of retreatment smear positive patients during the period between January–December 2012 in Najaf

Discussion

Normally babies do not pass meconium while in utero. In response to hypoxic stress babies may pass meconium before birth and are likely to be candidates for problems related to meconium passage and its inhalation. It is believed that these babies are more prone to infections as meconium enhances bacterial growth and may predispose such babies to secondary bacterial infections. In addition, meconium passage has been incriminated as a pointer of in-utero infection [6]. Several intrapartum risk factors can cause elevation in CRP levels. However, this test may be useful in excluding infection [7].

This study shows that the incidence of caesarean section in the patient with MSAF (58.1%) is higher than the patient with clear liquor 41.9%. this study correlate with study done by Chaturvedi et al, [8] and Basima sh, [3] in which they found significantly high rate of emergency caesarean section and consequently the low chances of having vaginal delivery with MSAF. In addition, we found that there is no significant difference in the mean weight of the baby delivered of mother with MSAF (3.01+.4) and those with clear liquor (3.24+0.6), while a study conducted by Nayak et al, who is found there are 32.4% of babies with MSAF weight <2.5 kg and 62.56% weight between 2.5-3.5 and 5.02% weight >3.5 kg [9]. Regarding the biochemical profile and fetal heart rate of the baby there was no significant difference between MSAF and CAF, while study done by Berks et al show that the infant with MSAF higher risk of an abnormal fetal heart rate tracing in each stage of labour and cord arterial PH less than 7.20 (indicator of fetal compromise) compared to clear amniotic fluid group [10].

This study found that the Apgar score in 1 mint with baby delivered with MSAF 44.8% was 4-6 while those with CAF 55.2% and Apgar score in 5 mint in baby with MSAF 51.6% was 7-10 while in CAF 48.4% was 7-10, a study done by the National Institute of Clinical Excellence, UK and miller et al shows that the Apgar score at 1 and 5 minutes vis-à-vis the degree of MSAF 50% of babies with MSAF had an Apgar score of less than 7 at one minute. This recovered with resuscitation and only 0.18% had an Apgar score below this value at 5 minutes [11]. while 70% of the baby with MSAF needs admission to the NICU, only 30%of the baby with CAF needs admission this study correlate with Dargaville which is show that MSAF associated with admission to NICU in which the number of babies requiring NICU admission were 62 in case of thick meconium and 19 in case of thin meconium 40 babies required admission to the NICU just for observation for respiratory distress and was discharge within 24 hours from NICU [12].

CRP is one of the most widely available, most studied, and most used laboratory tests for bacterial infection, and despite the continuing emergence of new infection markers, it still plays a central role in the diagnosis of early-onset sepsis. CRP has the advantage of being well characterized in numerous studies, and the extensive knowledge of its properties and limitations makes it safer compared to other, newer markers [13]. In regards to CRP in patient with MSAM, a study done Bystrok, bots study the CRP in a large healthy sample of women varying in their reproductive status. In these young adult women from Cebu, Philippines, CRP was markedly higher among women who were in more advanced stages of pregnancy and median CRP concentration were roughly 10-fold higher among women in their 2nd or 3rd trimesters compared to women who were nulliparous at the time of measurement [14]. In our study we found that the level of CRP in patient with MSAM is significantly higher than those with CAF, this may support the hypothesis that the color of meconial fluid is associated with the inflammatory biomarker CRP, and thereafter to evaluate the role of antibiotics in preventing infection in babies born through meconium stained amniotic fluid, in fact we found no study done to compare our results, and this probably needs to be confirmed by other study on a large number of patients, In addition to other studies for detection of meconium stained amniotic fluid by detecting the level of CRP in different gestational age.

Conclusions and Recommendation

There was a significant increment in the level of C- reactive protein in women with MSAF and thereby the C- reactive protein may be involved in the pathogenesis of MSAF. Further studies need for a larger number of women to predict meconum stain amniotic fluid by early detection of any elevation of CRP during pregnancy prior to delivery.

Competing interests

The authors declare that there is no conflict of interest.

Author Contributions

All authors wrote, read and approved the final manuscript.

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