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Prediction of preterm labour with the detection of cervical phosphorylated insulin like growth factors

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Abstract

To evaluate the prediction of preterm labour with the detection of cervical phosphorylated insulin like growth factors.

Keywords: Preterm labour, cervical phosphorylated insulin like growth factors, Gestational age, cervical dilatation

Introduction

Objective

To evaluate the prediction of preterm labour with the detection of cervical phosphorylated insulin like growth factors.

Methods

The study was conducted in the Dept. Of Obstetrics and Gynaecology in Institute of Obstetrics and Gynaecology, Chennai from December 2018 - September 2019. The study is a prospective study involving 50 patients presenting to our hospital with symptoms of preterm labour. These included pregnant females with 28-36 weeks of gestation selected both outpatient department and casualty.

Inclusion Criteria

- Gestational age between 28-36 weeks
- Regular uterine contractions
- Intact membranes
- Cervical dilatation 1 to < 3 cm

Exclusion Criteria

- Pregnancy before 28 and after 37 weeks
- Premature rupture of membranes
- Bleeding per vagina
- if they had cervical encircage
- had been on tocolysis at admission
- cervical dilatation of more than 3 cm
- Multiple pregnancies
- Hypertensive disorders complicating pregnancy
- Heart disease complicating pregnancy
- Other maternal and fetal indications requiring termination of pregnancy such as intrauterine growth retardation, lethal congenital malformations, were also excluded from the study.

Methodology

The bedside test kit for pIGFBP-1 is an immuno-enzymatic test using monoclonal antibody for detecting antibody specific for the phosphorylated form of IGFBP-1.

After explaining the procedure to the patient and getting the consent patient is placed in the dorsal position. A sterile dacron swab was applied over the cervical os and was left approximately for 10-15 seconds to absorb cervical secretion.

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The specimen was extracted from the swab by swirling the swab vigorously in the tube containing extraction solution for 5- 10 seconds.

Reading the result

Positive: When two lines were visible.

Negative: When only one control line was visible.

Absence of distinct control line meant invalid result.

The test is based on immune-chromatographic qualitative analysis of cervical phosphorylated insulin-like growth factor binding protein-1.

All cases were administered a course of corticosteroids to enhance foetal pulmonary maturation as well as tocolysis as per our departmental protocol. All patients were followed up to delivery. Following delivery, data collection about admission to delivery interval was analysed.

Table 1: Test AT Admission

Test	No. Of Cases	Percentage
Positive	32	64%
Negative	18	36 %
Total	50	100 %

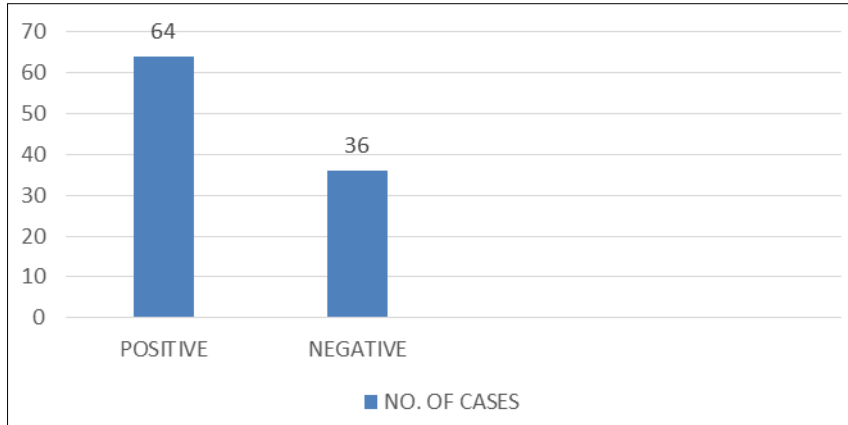


Fig 1: Test at admission in percentage

Table 2: Test Result: Delivery Status Crosstabulation

			Delivery Status		Total	P value
			Delivered	Not Delivered		
Test Result	Positive	Count	30	2	32	<0.001**
		% within Test Result	93.8%	6.3%	100.0%	
		% within Delivery Status	93.8%	11.1%	64.0%	
	Negative	Count	2	16	18	
		% within Test Result	11.1%	88.9%	100.0%	
		% within Delivery Status	6.3%	88.9%	36.0%	
Total		Count	32	18	50	
		% within Test Result	64.0%	36.0%	100.0%	
		% within Delivery Status	100.0%	100.0%	100.0%	

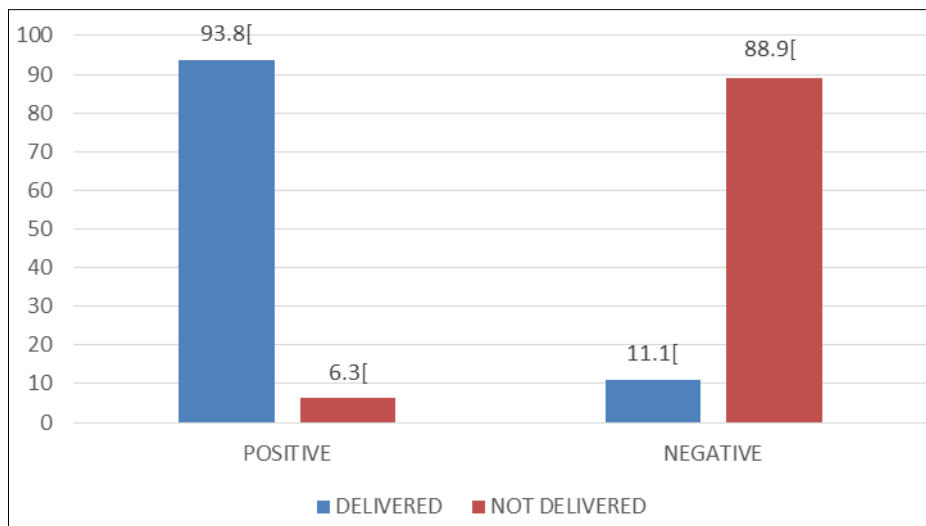


Fig 2: Delivery status crosstabulation

Table 3: Correlation of Obstetric Status and Test

S. No	Obst.Code	Delivered/Not Delivered	No of Cases	Percentage
1.	PRIMI +Ve	Delivered	18	100%
		Not Delivered	0	-
2.	PRIMI -Ve	Delivered	0	-
		Not Delivered	7	100%
3.	MULTI +Ve	Delivered	12	85.71%
		Not Delivered	2	14.29%
4.	MULTI -Ve	Delivered	2	18.18%
		Not Delivered	9	81.82%

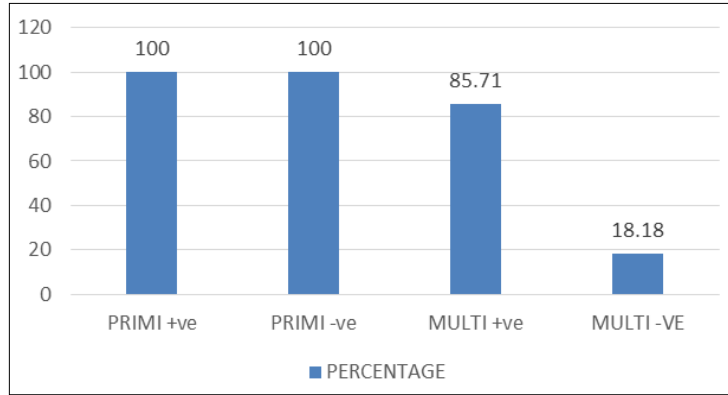


Fig 3: Correlation of obstetric status and test in percentage

Table 4: Correlation of Contractions and Test

Contractions	Tests	Total No.	Delivered	Not Delivered
2-3 Contractions	Positive	3	2	1
	Negative	18	2	16
3-4 Contractions	Positive	29	28	1
	Negative	-	-	-

Table 5: Correlation Cervical Dilatation and Test

Cervical Dilatation	Tests	Total No.	Delivered	Not Delivered
1F	Positive	14	14	-
	Negative	6	-	6
2cm	Positive	18	16	2
	Negative	12	2	10

Table 6: Correlation of Gestation Age and Test Result

Period Of Gestation In Weeks	Positive		Negative	
	NO	Percentage	NO	Percentage
28-30	8	25.1	5	27.78
30-32	4	12.5	5	50
32-34	11	34.38	7	22.22
34-36	9	28.12	1	
TOTAL	32	100	18	100

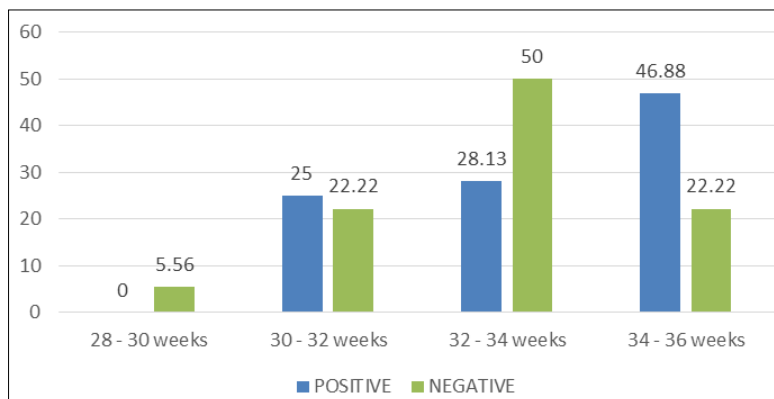


Fig 4: Correlation of Gestation Age and Test Result in Percentage

Table 7: Correlation of Test to Delivery Interval (Positive Test)

Test To Delivery Time Interval	Positive Test	
	NO.	Percentage
<2 DAYS	19	63.34 %
2-7 DAYS	10	33.33%
>7 DAYS	1	03.33%
TOTAL	30	100%

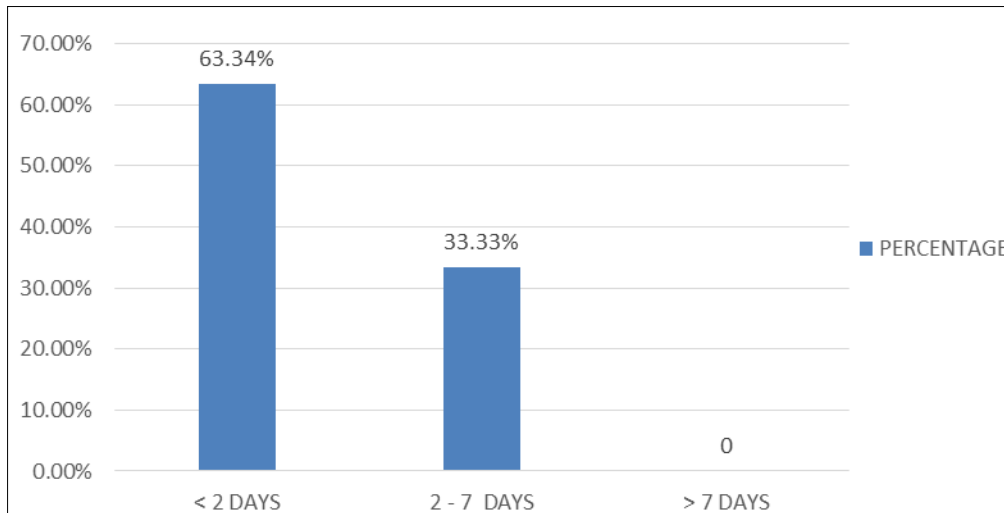


Fig 5: Correlation of test to delivery interval (positive test)

Table 8: Correlation of Test to Delivery Interval (Negative Test)

Test To Delivery Time Interval	Negative Test	
	No.	Percentage
<7 DAYS	5	31.25 %
Up to 7 DAYS	11	68.75%
TOTAL	16	100%

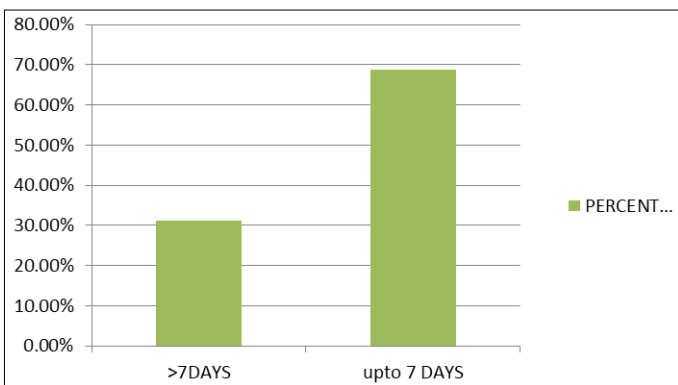


Table 6: Correlation of test to delivery interval (negative test)

Result

A total of 50 women were selected for the study with gestational between 28 and 36 weeks. Thirty two women (64%) tested positive for pIGFBP-1, only 2 delivered at term and the other 30 patients delivered preterm (<37 weeks) while eighteen women (36%) tested negative, only two delivered preterm. All the patients received antenatal steroids and tocolytic therapy according to our hospital protocols.

Among the 18 primigravida patients with a positive test, all 18 delivered and the 7 primigravida women with a negative test, none of them delivered. Among the 14 multigravida patients with a positive test, 12 delivered and the 11 multigravida women with a negative test, 2 of them delivered.

In patients with positive test 19 delivered within 48 hrs, 10 delivered within 2-7 days and 1 delivered after 7 days. In

patients with negative test 11 patients did not deliver up to 7 days and 5 patients continued pregnancy beyond 7 days. Only two patients who had a negative test delivered prematurely.

Discussion

In our study 32 women (64%) tested positive for PIGFBP-1, while 18 women (36%) tested negative. Among the 32 positive test patients, only 2 delivered at term. Among the 18 women negative test patients, only two delivered preterm (*p* < 0.05).

The PPV of the test is 93.75% and the NPV is 88.89%. The *p* value was <0.001. The sensitivity being 93.8% and specificity being 8.9% for the prediction of preterm delivery before 36 weeks.

Conclusion

Cervical phosphorylated insulin like growth factor binding protein -1 alone is a useful tool for predicting women who are at risk for pre-term delivery. It is a rapid bedside immune enzymatic test, is an easy, lucid, faster, convenient method of predicting preterm labour and exclusion of premature labour and delivery in symptomatic women. The test is easy one step rapid dip stick test and can be done by any health worker clinicians, nurses, or laboratory technicians in both urban and rural settings and does not need expertise opinion.

It is less expensive. With symptomatic patients a negative test result is a clear indication that the delivery will not start within the next 7 days. Cervical phosphorylated insulin like growth factor binding protein -1 has a higher negative predictive value of 1 in predicting risk of delivery within 48 hrs. If facilities available, this can be combined with measurement of cervical length and this will further increase the predictive value in predicting pre-term delivery in symptomatic women.

It will allow us to focus on women who are more likely to deliver preterm and timely in utero referral to higher centres equipped with neonatal resuscitation and preterm care. It also helps us avoid unnecessary referral and treatment and to curtail health care burden and costs.

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