

GNK-PIMS Score: A Predictive Model for Success of External Cephalic Version

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ABSTRACT

Objective: To determine association of GNK-PIMS score vs Newmann Peacock score with success of external cephalic version (ECV).

Materials and methods: This comparative cross-sectional analysis was carried out at MCH center Unit I, PIMS, Islamabad, from 1st January 2006 to 31st December 2009. Characteristics of 166 breech versions performed during study period were integrated into both Newmann Peacock score and GNK-PIMS score. Association of the two scoring systems with success of ECV was determined using Student t-test, correlation coefficient, Chi-square test and Cox and Snell test. The individual characteristics of two scores were also evaluated by stepwise linear regression model.

Results: The success rate of ECV was 49.9%. Newman Peacock score had weaker correlation with success of ECV ($r = 0.234$, $p = 0.001$) than GNK-PIMS score ($r = 0.716$, $p = 0.000$). The success rate was 6.3% at a score of <3 and 60% at >8 with Newmann Peacock score while that with GNK-PIMS score was nil at a score of <3 and 100% at >8. All individual parameters of the GNK-PIMS score had significant association with success of ECV compared to only three variables of Newman Peacock score.

Conclusion: GNK-PIMS score is stronger predictor of ECV success than Newman Peacock score. Larger randomized controlled trials should be conducted based on this scoring system.

Keywords: External cephalic version, Newman Peacock score, GNK-PIMS score.

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INTRODUCTION

External cephalic version (ECV) has been shown to decrease the incidence of breech presentation at term, thus reducing the cesarean section rate by about 50%. It is recommended by both RCOG¹ and ACOG as procedure of choice for all term breech presentations.² The major hindrance in the popularity of this procedure is uncertainties on the part of clinician about the chances of success of ECV attempt and potential complications.³ Therefore, prediction of outcome of ECV is an important issue that needs to be individualized. In this regard, various predictors of success of ECV have been reported in the literature. The sonographic predictors include type of breech, amniotic fluid index and placental location⁴ while clinical predictors reported

are station of breech, dilatation of cervix, parity and estimated fetal birth weight.⁵ These variables have been integrated into various scoring systems to develop predictive models which are tested against the success of ECV. Most commonly used is Newmann Peacock score which incorporates parity, fetal weight, location of placenta, station of breech and dilatation of cervix.⁶ This scoring system is restricted by the fact that there is significant overlap in scores between the successful and unsuccessful ECV, which renders it clinically less useful. Thus, search for an ideal scoring system continues.

In our unit, as a standard of care, ECV is offered to every potential candidate. To predict success of procedure, various predictors have been evaluated and their association with success of ECV tested.⁷ These factors have now been integrated into a predictive model labeled as GNK-PIMS score which includes parity, body mass index, gestational age, type of breech and amniotic fluid index. This study is an evaluation of correlation of GNK-PIMS score vs Newmann Peacock score with success of ECV.

MATERIALS AND METHODS

Women presenting at term with breech presentation, fulfilling the criteria of ECV, were included in the study. Women with multiple gestation, previous uterine scar, deeply engaged breech, nonreassuring fetal heart rate pattern, amniotic fluid index <7 cm, fetal or placental anomalies, in active labor or any contraindication to vaginal delivery were excluded from the study. Informed and written consent was taken for participation in the study. The patients were admitted in the high dependency area (HDA) of labor ward, adjacent to operation theater. They were prepared for emergency cesarean section. Detailed history, clinical examination and recent ultrasound findings were recorded. Subcutaneous injection of Salbutamol, 0.25 mg, was given 15 minutes prior to procedure. ECV was done using standard technique, after ensuring fetal well being. Patient was kept under observation for 2 hours. An ultrasound and CTG were done following ECV. In case of failure, second attempt was done 5 to 10 minutes after the first attempt. The procedure was abandoned in case of failure of second attempt, maternal discomfort or fetal distress on CTG. After ECV, different options of induction of labor, cesarean section or follow-up were adopted, depending on the outcome of ECV. Both GNK-PIMS and Newmann Peacock scores were calculated in all the patients who underwent ECV. The data was analyzed by using computer software statistical package for social sciences (SPSS) version 10. Association of the two scoring systems with success of ECV was determined using Student t-test, Chi-square test, correlation coefficient and Cox and Snell test. The individual characteristics of two scores were also evaluated by stepwise linear regression model.

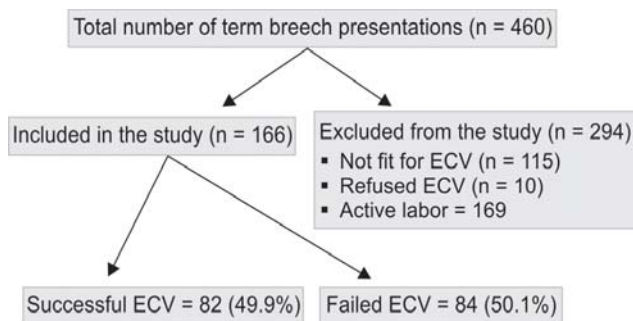


Fig. 1: Study population

RESULTS

During the 4 years study period, 460 women were presented with breech presentation at term. Of these, 166 women fulfilled the criteria for ECV and were included in the study (Fig. 1). ECV was successfully accomplished in 82 (49.9%) women. Demographic characteristics of the study population are shown in Table 1.

Our study showed strong correlation between GNK-PIMS score and success of ECV ($r = 0.716, p = 0.000$). The success rate was nil at a score of <3 and 100% at >8 . On the other hand, Newman Peacock score had weaker correlation with success of procedure ($r = 0.234, p = 0.001$). The success rate was 6.3% at score of <3 and 60% at >8 (Table 2). The average Newman Peacock score for failure was 4.93 and for success 5.59 with a p value of 0.002, while average GNK-PIMS score for failure was 4.87 and for success was 7.37 with a p-value of 0.000.

Among individual parameters, all five variables of GNK-PIMS score had significant association with success of ECV (Table 3) as compared to only three parameters of Newman Peacock score (parity, station of breech, location of placenta), while cervical dilatation and fetal weight had no association with ECV success as shown in Table 4.

Table 1: Demographic characteristics

Variables	Successful ECV (n = 82)	Failed ECV (n = 84)
Age (mean ± SD)	26.84 ± 4.182	25.26 ± 3.93
Parity		
Nulliparous	28 (34.1)	58 (69)
Multiparous	54 (65.9)	26 (31)
Gestational age (mean ± SD)	38.61 ± 0.53	38.08 ± 0.623
Height (mean ± SD)	159.2 ± 6.4	159 ± 6.6
Weight (mean ± SD)	67.8 ± 8.8	66.3 ± 8.3

Table 3: Association of individual parameters of Newman Peacock score with success of ECV

Variables	Successful ECV (n = 82) n (%)	Failed ECV (n = 84) n (%)	p-value
Parity			
0	28 (32.6)	58 (67.4)	0.000
1	14 (60.9)	9 (39.1)	
>2	40 (70.2)	17 (29.8)	
Fetal weight			
<2500 gm	01 (25)	03 (75)	0.589
2500-3500 gm	75 (50.3)	74 (49.7)	
>3500 gm	06 (46.2)	07 (53.8)	
Location of placenta			
Anterior	26 (52)	24 (48)	0.014
Posterior	40 (59.7)	27 (40.3)	
Fundal	16 (32.7)	33 (67.3)	
Station of breech			
>1	2 (11.8)	15 (88.2)	0.004
2	39 (51.3)	37 (48.7)	
<3	41 (56.2)	32 (43.8)	
Dilatation of cervix			
>3 cm	13 (41.9)	18 (58.1)	0.288
1-2 cm	50 (54.9)	41 (45.1)	
0 cm	19 (43.2)	25 (56.8)	

*p-value <0.05 is considered significant

Table 4: Association of individual parameters of GNK-PIMS score with success of ECV

Variables	Successful ECV (n = 82) n (%)	Failed ECV (n = 84) n (%)	p-value
BMI			
<25	33 (70.2)	14 (29.8)	0.000
25-30	47 (47)	53 (53)	
>30	2 (10.5)	17 (89.5)	
Parity			
0	28 (32.6)	58 (67.4)	0.000
1	14 (60.9)	9 (39.1)	
>2	40 (70.2)	17 (29.8)	
Gestational age			
37-38 weeks	52 (72.2)	20 (27.8)	0.000
38-40 weeks	28 (35.4)	51 (64.6)	
>40 weeks	2 (13.3)	13 (86.7)	
Type of breech			
Flexed	64 (72.7)	24 (27.3)	0.000
Extended	18 (24.3)	56 (75.7)	
Footling	0	04 (100)	
Amniotic fluid index			
<7	1 (10)	9 (90)	0.001
7-10	43 (43.4)	56 (56.6)	
>10	38 (66.7)	19 (33.3)	

p-value <0.05 is considered significant

Table 2: Comparison of Newman Peacock score with GNK-PIMS score

Score	Newman Peacock score				GNK-PIMS score			
	n	Success rate	Failure rate	p-value	n	Success rate	Failure rate	p-value
0-3	16	6.3%	93.8%	0.001	13	0	100%	0.000
4-7	140	33.6%	46.4%		116	38.8%	61.2%	
8-10	10	60%	40%		37	100%	0	

p-value <0.05 is considered significant

DISCUSSION

ECV is a potentially useful procedure for conversion of breech into cephalic presentation and thus an attempt toward decreasing cesarean section rate due to breech presentation.¹ However, low success rate is still one of the major issues related to the procedure. Proper selection of cases reduces the failure rate, thereby improving the confidence of both the clinician and patients. Various parameters (parity, AFI, type of breech, engagement of breech, fetal position, estimated fetal weight, placental location, etc.) have been reported in the literature to be predictive of success of ECV.⁴⁻⁶ Of these, parity, non engaged breech, posterior placenta, complete breech and adequate liquor volume have been found to be significantly associated with success of ECV. GNK-PIMS scoring system consisted of some of the predictors mentioned above (parity, AFI, type of breech) and others (BMI, gestational age), which have been found useful from our own experience.^{7,8}

Tocolytic agent was not taken as a variable in our predictive model as it has been proven useful in our previous study⁷ as well as other local and international studies^{11,13} and is used routinely in all ECV procedures in our unit. Similarly, cases with engaged breech were excluded from the study. This was in view of the fact that it is recommended as a contraindication for ECV.¹¹⁻¹³

In our study, 82 women (49.9%) were successfully converted from breech to cephalic presentation. This was similar to that reported by Hutton et al (49.1%)⁹ and Kuppens et al (55%).¹⁰ The success rate in local studies varies from 47 to 67.5% while that in international studies is quoted from 48 to 77%.⁷

Our study showed that both scoring systems had significant correlation with success of ECV. Similar positive relationship between a rising Newman Peacock score and successful version was found in the original Newman et al study.¹¹ The only difference was that a score of <3 was taken as lower cutoff limit in our study compared to <2 in original study. As per expectations, stronger correlation was found with the GNK-PIMS score than Newman Peacock score. Our study also showed that Newman Peacock score can only predict about 5.5% of variation in success of ECV compared to 51% by GNK-PIMS score.

Of the five variables of Newmann Peacock score, only three were significantly associated with success of ECV. Of these, strong association was seen only with multiparty which was included in our score also. Similar association have been reported by other researchers signifying the importance of this variable.^{5,7,10-12} It is hypothesized that decreased tone in the uterus and abdominal wall in multiparous women allows the external version to proceed with less physical effort and less patient discomfort.

The remaining four variables of GNK-PIMS score (BMI <27, gestational age 37 to 38 weeks, flexed breech and AFI) were also found to be significantly associated with ECV success. Adequate liquor volume is universally accepted as an indicator of success of ECV,^{3,4,7,11,14,15} similar to our results. It may be because adequate liquor volume allows easy palpation

and mobilization of fetal parts. ECV performed at early gestation seems to influence the success rate indirectly through adequacy of liquor volume and nonengagement of presenting part as shown by Aisenberry et al.¹³ In our study, BMI was found to be one of the strongest determinants of ECV success as reported by Ben Mier et al,¹¹ while some authors have used ease of palpation of fetal head as an indirect assessment of BMI.^{5,13} Similarly, positive association of flexed breech with success of ECV has been reported in many studies previously,^{4,10,12} which is in accordance with our results.

CONCLUSION

We conclude that GNK-PIMS score is a stronger predictor of ECV success than Newman Peacock score. It may be incorporated in assessment of patients undergoing ECV. It will enable us to counsel the patient more precisely as well as build up the confidence of the clinician performing ECV, thus facilitating decision-making for both woman and the provider. However, in view of cross-sectional nature of the study, the predictive model needs to be tested prospectively for generalization of results.

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