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RESEARCH ARTICLE

ETD-EXPECTED 'TIME' OF DELIVERY-A NEW SIMPLE CLINICAL TOOL FOR MANAGEMENT OF LABOR

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ABSTRACT:

Introduction: Just as every obstetrician gives an EDD (Expected date of delivery) to each antenatal patient right at the first visit, it is logical that he or she should also give an ETD (Expected 'Time' of delivery) to each of his or her labor case right on her entry into the 'Active phase' of labor. But concept of such a very logical tool has not yet appeared in the text books. The pu rpose of the present study is to assess the validity of this new obstetric tool. Objective –Though an expected date of delivery (EDD) is allotted in each antenatal case, the corresponding time end point i e the expected 'time' of delivery (ETD) is not allotted for the labor cases which is a big clinical lacunae. To fill this lacunae the concept of ETD was introduced for the first time by Debdas in 2006 which he used for his 'Paperless Parto-gram'. The objective of this study was to check the validity of this tool-ETD..

Materials- A total of 354 cases of 'natural labor' (not induced, not augmented) and who delivered normally vaginally were collected in prospective manner from the labor unit of Bankura Medical college, West Bengal during the eight months period from 1st April to 1st december2013. The proportion of primi and multi was 2:1. Method- At the very first PV in 'active phase' of labor when the cervix was at least 4 cm dilated, ETD was found out – by using the Friedman's formula of cervimetric progress of labor - of 1 cm/hour e g if in a case the cervix was found 4 cm dilated at 2 PM, her ETD would work out as – 2 PM +6 hours = 8 PM assuming that she would take 6 hours to dilate the remaining 6 cm to become 10 cm. Results- On matching the 'actual time of delivery' with the calculated ETD, it was found that 82% of primi and 91.6% of multi delivered before the ETD. The only 15% of cases who exceeded ETD, 68% (36 out of 53 cases) delivered by next 2 hours of their predicted ETD and only 5 cases exceeded 4 hours i e the 'Action ETD' mark. Conclusion- ETD is a highly reliable clinical tool for management of labor and may serve as an alternative to the complex graphical form of conventional partogram. By stamping the end point it instantly programmes the labor and would thereby prevent prolonged and obstructed labor.

Key words: Partogram, APGAR score, Active stage of labour, Second stage of labour

INTRODUCTION:

Just as every obstetrician gives an EDD (Expected date of delivery) to each antenatal patient right at the first visit, it is logical that he or she should also give an ETD (Expected 'Time' of delivery) to each of his or her labor case right on her entry into the 'Active phase' of labor. But concept of such a very logical tool has not yet appeared in the text books. The purpose of the present study is to assess the validity of this new obstetric tool..

REVIEW OF LITERATURE

This tool was first introduced by Debdas of Jamshedpur (Debdas, in 2006)(1). Since then it has been presented in various national and international conferences including countries like Sri Lanka (2) and Bangladesh(3) and reported in various abstract volumes. There has been wide discussion on it in the net at the WHO's web site (se-mch@solutionexchange-un.net.in) (4)- Solution Exchange-Maternity and Child Health - in July and August 2008 with favorable comments. Responses came from UNESCO, Dar-es Salaam , Ministry of Health, Malaysia and also from independent consultant from Chicago.

It is noteworthy that. ETD constitutes the software for 'Paperless Partogram' and has been translated in French, Spanish and Arabic...

MATERIALS

Irrespective of age and parity, a total of 354 cases of 'natural labor' (not induced, not augmented) and who delivered vaginally were collected in prospective manner from the labor unit of Bankura Sammilani Medical college during the five months period from first of April 2013 to 31st August 2013. .

Criteria for inclusion

At the point of inclusion the patient must be –

- in established labor i.e the uterus is contracting at least 3 to4 in 10 minutes or more frequently
- at least 4 cm or more dilated
- of at least 37 completed weeks or more of gestational maturity
- in cephalic presentation

State of membranes- whether intact or ruptured is immaterial.

Exclusions – Induced labor, previous caesarean, twins, breech, severe PIH, APH or presence of any severe complication.

METHOD

At the very first PV in 'active phase' of labor when the cervix would be at least 4 cm dilated, ETD was worked out – by using the Friedman's formula of cervimetric progress of labor - of 1cm/hour (Freidman, 1954)(5). To exemplify, if in a case the cervix was found 4 cm dilated at 2 PM vaginal examination, her ETD was worked out as

– 2 PM +6 hours = 8 PM assuming that she would take 6 hours to dilate the remaining 6 cm to become 10 cm or fully dilated. This time figure was termed 'ALERT ETD'. At the same time another time figure was written next to it which was termed 'ACTION ETD' which was derived by simply mentally adding 4 hours to the 'Alert ETD' time (8 PM +4 hours) = 12 midnight in this case. .

These time figures were entered very prominently on the front page of the case sheet so that it attracts attention of all concerned in the labor room and manage labor accordingly.
This initial (landmark) PV and the derivation of ETD in each case was done by the author herself.

ANALYSIS OF DATA AND RESULTS

Parity distribution – The proportion of primi(69.77%) and multi(30.23%) in this series was 2 : 1 (247 :107 No of cases). Multis were all between para 1-4.

Age distribution – The age range of 55.65% (92 cases) patients were between 20-25 years. Nearly 34% (33.62 % precisely) were in their teen age. Only 9 mothers were above 30 year

Distribution of gestational age – There was no mother under 37 weeks because they were excluded.No mother at 42weeks gestation was seen.Around 92% were between 37-40weeks.

Distribution of birth weight – As can be seen from table IV, 39.2% babies weighed between 2001-3000 gm (rather on the low side) perhaps because almost all mothers were from low socioeconomic class. 11.63% babies weighed between 3.1 to 3.5 kg. Lowest birth weight was 1.45kg and highest birth weight was 3.8 kg.

Table I : Birth weight distribution of ETD tally group and non-tally group

Birth weight	No. of cases	(%)	
< 2 KG	- 10	- 3.32%	
2.0-2.5 kg	- 118	- 39.20%	84.38 % patients delivered average size babies
2.6-3.0 kg	- 136	- 45.18%	
3.1-3.5kg	- 35	- 11.63%	
3.6 and above	- 02	- 0.67%	
Total	- 301	- 100%	

Analysis of overall validity of ETD – It was remarkable that as high as 85.03% (301cases) delivered before the ETD, while only 14.97 % (53 cases) exceeded the calculated ETD.

Overall tally of the Predicted ETD (out of all 354 cases) 301(85.03%) patients were delivered within the ETD and 53(14.97%) patients delivered after ETD

Analysis of validity of ETD in primiparae – As high as 82.11% (202 cases) delivered before the ETD and only 17.89% (44cases) after the predicted ETD.

Analysis of validity of ETD in multiparae — As high as 91.67 % (99 cases) delivered before the ETD and only 8.33 % (9 cases) after the predicted ETD.

Further analysis of the 53 cases who delivered 'after' the ETD – This has been presented in Table II

Though the number is small for any statistical analysis yet the remarkable thing here is only 5 cases (9.43%) crossed the four (4) hour mark among the 53 cases – the cut of point for the 'action line' (Philpott & Castle, 1972 a,b). In fact, it constitutes mere 1.41% of the total number of cases (354) studied.

Table II: Analysis of of cases that exceeded ETD

No of primi- 44(83.02%)
No. of multi- 09(16.98%)
Total- 53(100%)

Table – III: Analysis of 'degree' of lack of predictability of ETD by hours (of the cases those exceeded the predicted ETD (Total- 53.No.s)

	No. of cases (	%)
Exceeded up to/ within 1 hour -	22	41.51%
Exceeded between 1-2 hours –	14	26.41%
Exceeded between 2-3 hours –	09	16.98%
Exceeded between 3-4 hours –	03	5.67%
Exceeded more than 4 hours–	05	9.43%
Total	53	100%

Further analysis of the cases who delivered 'before' the ETD – This has been presented in table IV for primi and V for multi group.

Table IV: analysis of primi cases who delivered before ETD

Delivered 2hrs before- 164 (81.18%)
Delivered 1hr before- 38(18.82%)
Total - 202 (100%)

Table V Analysis of multipara who delivered before ETD

Delivered 2hrs before - 71 (71.72%)
Delivered 1hr before - 28 (28.28%)
Total - 99 (100%)

TableVI- Mode of delivery

Normal- 349 (98.59%)
Forceps- 5 (1.41%)
Vacuum- 0
Total- 354 (100%)

Indications for forceps delivery-foetal distress(2)

Prolonged second stage of labour(3)

Table VII: Apgar distribution of the cases who delivered within their predicted ETD(N=301) 97.34 % of the patients delivered within the ETD and have a APGAR score of 7-10 which denotes satisfactory fetal condition and use of ETD deos not increase fetal distress.

Apgar Score	No. of cases	(%)
7-10	293	97.34%
4-6	3	0.99%
3 or less	5	1.67%
Total	301	100%

Apgar distribution of the cases who delivered after their predicted ETD(N=53) even the babies delivered after ETD has no significant increase in incidence of fetal distress having APGAR score of 7-10 in 98.11 % (52)of cases.

Table VIII : Comparative analysis of the cases delivered 'before' the ETD

How long before	Primiparae(N-202)	Multiparae(N-99)
	No. of cases	No. of cases
More than 3 hours before	118 (58.42%)	58 (58.59 %)
Between 2-3 hours	41(20.29%)	19 (19.19%)
Within 2 hours before	43(21.29%)	22(22.22 %)
Total	202 (100 %)	99(100 %)

Table IX: Further analysis of primiparae cases (44 only) who delivered 'after' ETD

How long after	No. of cases
Within 2 hours after	29 (65.90%)
Between 2-3 hours after	15 (34.10%)
Total	44 (100%)

(None exceeded 3 hours)

Further analysis of multiparae cases (9 only) who delivered 'after' ETD :

How long after	No. of cases
Within 2 hours after	8
Between 2-3 hours after	1

DISCUSSION

There can be no doubt that ETD is a clinical necessity for management of labor just as EDD is for management of pregnancy but the question is how valid is ETD, as calculated by Friedman's formula and proposed by Debdas (2006) (1). Not only this, even Friedman's formula needs revalidation for mothers of the Indian subcontinent because its field study was done in a distant different continent on a very different race, and racial variation in cervimetric progress of labor has been reported.

Further, all the more, since conventional partogram is based on the Friedman's formula,. an Indian field-study is required to establish whether the conventional partogram is valid in Indian context.
The present study, though covers a rather small number of patients (354 cases), very strongly proves that ETD (which is based on the Friedman's formula) is a very valid tool
for management of labor with as 85 % cases delivering before the predicted ETD.

When only primigravid patients were looked at, as high as 82% delivered before their calculated EDD which goes to establish its high validity in this rather sensitive unknown obstetric quantity.
Remarkable 91.67% multiparae delivered before their allotted ETD which is expected because they are expected to dilate faster (at 1.5 cm/hour) and as high as 71.72% of them delivered more than 2-3 hours earlier than their ETD. Thus it was interesting to note that all the findings presented above tallies with that of Philpott (1972) (6) which go to certify that ETD exactly tallies with the 'Alert line' of partogram and adding 4 hours to ETD would give the 'Action line', and this is what has been proposed by Debdas (2006) (1) and is used for his 'Paperless partogram' (Debdas, 2006) (1), (Debdas, 2009) (3).
Besides above, the medico-social importance of ETD cannot be ignored because by ETD system one is monitoring labor by the same formula as used in conventional WHO partogram which is medico-legally valid. Moreover, it makes counseling of patient and her relations much easier than with WHO partogram because every understand 'time' and very few a curve or a graph as in WHO partogram.

In resource poor situations, ETD may be used as a 'Transfer point' – patient has reached ETD and she has not delivered – she should be transferred to the nearest referral centre.
(Debdas, 2008) (2).

CONCLUSION

ETD is a highly reliable clinical tool for management of labor and may serve as a alternative to the complex graphical form of conventional partogram which requires well equipped and trained staffs. It is also not very easy to manage in a busy labour room. By stamping the end point it instantly programmes the labor and would thereby prevent prolonged and obstructed labor.

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