Assessment of perinatal outcome – analysis of 7 years of STAN usage in normal pregnancies.

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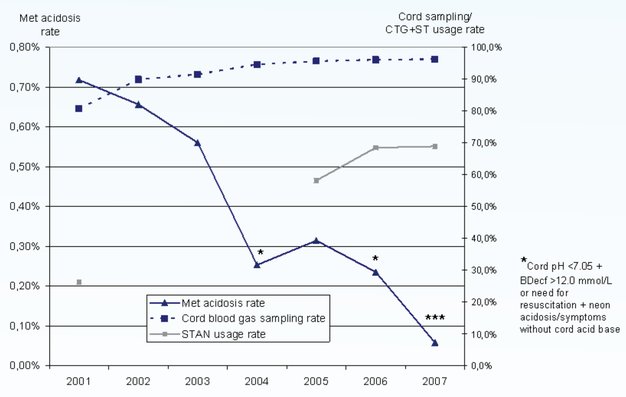
Assessment of medical praxis may take the form of Randomised Controlled Trials (RCT) and Quality Investigations (QI). CTG+ST analysis for fetal surveillance have been investigated using both. The current analysis presents QI data from the Mölndal Labour Ward, comparing the outcome recorded during 2001 with those obtained 2005 – 2007. Over the period 1998 – 2005, we have noticed a marked reduction in perinatal mortality with the 4-year average PNM decreasing by 44%, from 6.5 to 4.3 (OR 0.66, 0.54-0.82, p<0.001)[11]. This observation lead to the current investigation into what markers of obstetric care may be associated findings.

Fig 1 2001 – 2007 Annual metabolic acidosis* and cord sampling/STAN usage rates at Moelndal District General Hospital Labour ward, Gothenburg, Sweden



*Cord pH <7.05 + BDecf >12.0 mmol/L or need for resuscitation + neon acidosis/symptoms without cord acid base

Methods: STAN recordings have been prospectively collected (2001, 2005-2007, 7441 cases) and clinical data from 22171 term deliveries in active labour have been gathered from the hospital patient database for the period 2001 - 07 (Obstetrix, Siemens). Metabolic acidosis is defined as cord pH<7.05, BDecf >12 mmol/L. In case of inadequate cord blood gases, a case with Apgar <7 at 5' requiring active resuscitation + admission to neonatal care was indexed as a metabolic acidosis case.

Results:

Figure 1 gives the met acidosis data collected over the 7 years. During 2007 there were 2 cases out of 3651 term deliveries in active labour out of which 2454 had a CTG+ST recording lasting >20 minutes. Note the usage of ST analysis in 70% of all deliveries. A reason for the reduction in met acidosis was a significant reduction in slow response rates[2] from 0.75% in 2001 to 0.09% for 2005-07.

Table I gives the outcome related to use of CTG+ST+ fetal blood sampling. FBS indicated abnormality in 83 cases. Note that all cases but one with CTG changes in 1st stage where an FBS indicated abnormality but ST was normal had cord artery pH >7.15! All had normal 5' Apgar

Table I

Distribution of non-reassuring Fetal Blood Samples and corresponding cord artery pH

			Distribution of cases with non-reassuring FBS					
	Cases with CTG+ST +FBS	Non reassuring FBS lactate >4.7 mmol/L or pH <7.20	Start during 2nd stage	Unstable FHR at onset	No ST data available	Non-reassuring FHR and normal ST in 1st stage	Non-reassuring FHR and normal ST in 2nd stage	ST event before FBS
	444	84 -19%	5%	4%	11%	13%	21%	46%
Mean cord art pH			7.15	7.11	7.14	**7.24**	**7.18**	**7.14**
						p=0.006	**p=0,04**	

- FBS is useful when you start a STAN recording late (during pushing) or have an unstable FHR at onset of a STAN recording or have no ST data available.
- If CTG+ST guidelines indicate normality, little is gained from additional FBS. Although lactate may indicate abnormality (>4.7 mmol/L), still there is nothing to indicate that the fetus is hypoxic if ST is normal.

Table II

EFM observations made in connection with Caesarean sections for fetal distress, n= 325 or 2.5% of deliveries in active labor 2001, -05, -06, -07

	STAN, n= 235						Conventional CTG, n= 90
	CTG+ST available, n=191			CTG only, n= 44			
	ST event, n=94	Normal ST, n=91	Preterminal CTG, n= 6	Preterm CTG, n= 1	Unstable baseline FHR at onset, n= 9	Stable at onset, n= 34	
CA pH, mean	7.18	7.25	7.10		7.06	7.20	7.17
95th CI	7.16-7.20	7.24-7.27	6.97-7.24		6.97-7.16	7.16-7.24	7.13-7.21
p	<0.0001				0.002		

Table II indicates the staff intervened on preterminal cases and cases with unstable FHR at onset. Cases with CSFD without CTG+ST indications had normal cord acid base.

Conclusions

The marked improvement in perinatal outcome was associated with:

- Increased STAN usage.
- Ability to identify adverse FHR patterns at onset of a recording.
- Ability to respond in time to CTG+ST information.

Additional information from FBS was useful;

- when STAN was started in 2nd stage,
- when the CTG showed unstable baseline FHR at onset and
- in case of no ST data being available.

Nothing was gained by adding an FBS (lactate) when ST was normal, despite abnormal CTG. The CS rate may be substantially reduced by acting according to STAN clinical guidelines.

1 Lilja H, Norén H, Devoe L. STAN monitoring: A five years experience in clinical practice. SMFM abstracts Am J Obst Gynec 2006:195:S218.
2 Norén H, Blad S, Carlsson A, Flisberg A, Gustavsson A, Lilja H, Wennergren M, Hagberg H. STAN in clinical practice – the outcome of 2 years of regular use in the city of Gothenburg, Am J Obstet Gynecol. 2006;195:7-15