NEW ZEALAND RESEARCH

Intrapartum Fetal Heart Rate Monitoring:

Using audit methodology to identify areas for research and practice improvement

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ABSTRACT

The purpose of the study was to explore the fetal heart rate monitoring practices of midwives and doctors to determine compliance with an evidence-based guideline for fetal heart rate monitoring endorsed by one New Zealand (NZ) District Health Board (DHB). A retrospective audit of 193 randomly selected medical records was undertaken over six months (July-December 2006). The audit revealed deficiencies in choice of fetal heart rate monitoring modality, monitoring technique, documentation, communication and use of a standardised approach and language for interpreting cardiotocograph (CTG) traces especially the description and categorisation of the four main fetal heart rate features. Multidisciplinary education and a standardised template for reporting CTG's were key recommendations.

Keywords:

Intrapartum Care, Fetal Monitoring, Midwifery, Clinical Effectiveness, Audit;

INTRODUCTION

The assessment of fetal well-being during labour is one component of a total package of intrapartum care provided to women. Intrapartum fetal surveillance aims to improve fetal outcomes by identifying fetuses with hypoxic acidaemia and has the potential to promote fetal health and improve neonatal status at birth. However, electronic fetal monitoring (EFM) as a stand-alone tool is ineffective in avoiding preventable adverse outcomes (Alfirevic, Devane & Gyte (2006). It is effective only when used in accordance with published standards and guidelines and when appropriate timely intervention is based on that interpretation (Simpson & Knox, 2000). Since the introduction of EFM over three decades ago women's intrapartum care has been increasingly dominated by the use of technology but there continue to be concerns around the interpretation of the findings of EFM and the effects on women and babies. Over time experts have agreed on guidelines for intrapartum fetal monitoring practice based on the best available evidence and professional organisations have developed templates to assist practitioners to accurately interpret the findings of EFM and the appropriate action to take based on the interpretation.

Case reviews following unexpected obstetric outcome have identified (amongst other things) substandard practice in relation to fetal heart rate (FHR) monitoring during labour (Miller, 2005). Such practices have included not using the most appropriate method of FHR monitoring, poor quality FHR monitoring; failure to use a structured approach to assessing the four main features of FHR monitoring (baseline rate, variability, accelerations, and decelerations), failure to interpret the FHR monitoring in a timely manner that enables a diagnosis of fetal distress and appropriate interventions and failure to use a chain of command to resolve clinical disagreements (ibid). It must also be highlighted that to assess these four main features of FHR monitoring appropriately there needs to be concurrent monitoring of uterine activity. Interpretation and management of FHR monitoring in labour continues to be a common issue in litigation (in countries where this is possible) involving adverse outcomes in term pregnancies (ibid). The United Kingdom (UK) Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI, 2001) has highlighted that errors in interpretations of FHR monitoring are a major contributor to infant morbidity and mortality. Globally it is known that inter-observer and intra-observer consistency is poor when it comes to interpretation of the findings of FHR monitoring (Simpson & Knox, 2000).

This paper describes the findings of a retrospective audit of one DHB's compliance with its current evidence-based policy for intrapartum fetal heart rate monitoring. Audit is a quality assurance process in health care that supports practitioners to constantly seek to improve care. Audit is defined as 'deciding what should be, comparing what should be with reality, identifying the gaps and taking action' (Morrell & Harvey, 1999, p.1). The developing profile of evidence-based medicine and clinical effectiveness emphasises the importance of the role of clinical audit when it comes to getting research into practice (ibid).

BACKGROUND TO THE STUDY

A small number of cases of unexplained perinatal asphyxia in babies requiring admission to the neonatal intensive care unit triggered senior staff of the DHB to investigate possible causes. Questions were asked about fetal surveillance in labour. The delivery unit in which these babies were born has an evidence-based policy for intrapartum EFM, which includes guidelines for intermittent auscultation (IA) and fetal blood sampling (FBS), based on the Royal College of Obstetricians and Gynaecologists (RCOG) / National Institute of Clinical Excellence (NICE) guidelines (RCOG, 2001).

A preliminary review of several maternal medical records suggested there were deficiencies around compliance with the policy including decision-making around fetal monitoring modality, interpretation and classification of the four main features of FHR monitoring, use of concurrent uterine activity monitoring, documentation and action plans. As a result of this, a group of senior midwives from the DHB were enrolled to conduct a study of intrapartum fetal heart rate monitoring practices of midwives and doctors over a period of six months at the end of 2006. An audit methodology was chosen to determine the current state of practice in relation to the DHB intrapartum fetal heart rate monitoring policy, to discover where the major gaps were in practice and inform the design of an ongoing multidisciplinary education programme.

The setting for the study included the three maternity facilities (primary, secondary and tertiary), managed by one DHB in a major city in NZ. The level three tertiary referral unit, with a Maternal Fetal Medicine unit, caters for over 3000 births per year and incorporates level O primary maternity facilities in the suburbs 30-60 minutes from the unit. Women receive primary maternity care from a named lead maternity carer (LMC) either in the community or through the hospital. Choices of birthing facilities include the secondary/tertiary delivery suite or the primary maternity units. A multidisciplinary team, including core midwifery services, provide care for women receiving secondary or tertiary care.

METHODS

Policy selection

The policy against which current practice was measured is, "The Intrapartum Electronic Fetal Monitoring (EFM) and Fetal Blood Sampling (FBS) Policy", issued by the DHB in October 2003 and reviewed in October 2005. The policy, largely based on the RCOG evidenced-based clinical guideline Number 8 (2001), was developed by the Clinical Leader – Obstetrics, two midwifery policy and quality facilitators and authorised by the Women's Health Service medical Clinical Director.

Medical record selection

193 sets of medical records from women who gave birth within the DHB's three campuses, which included primary, secondary and tertiary level care, were audited over a six month period.

Sample size

The number of medical records needing to be audited to have 95% confidence (+/- 5% accuracy) from the whole population was estimated to be 340 based on the DHB's 2005 birth figures (http://www.ubht.org.uk/clinicalaudit/ClinicalAudit/). In most audits a small snapshot sample will probably be sufficient to indicate where standards are not being met. The pragmatic guideline for selecting the audit size is to enrol enough 'patients' so that senior clinicians/managers will be willing to implement changes based on the findings. Due to circumstances outside the control of the audit team (staff shortages, increased workload) it became difficult to audit as many notes as was planned and a compromise was made to select a more pragmatic sample size. The audit was suspended temporarily after a month to check consistency of data entry and to introduce samples from the DHB's two Primary Maternity Units. Before the audit ended in December 2006, a trend was establishing and it was apparent from early analysis that continuing to collect data would be unlikely to add any further new information to the findings.

Randomisation and chart selection

Using the Patient Information Management System (PIMS) and an Excel randomisation function, 25 medical records were randomly selected per week from a dataset of women who met the inclusion criteria (DHB birth, and not an elective caesarean section (CS). The selected medical records were identified by their unique identifying National Health Index (NHI) numbers.

Data collection

An audit tool was designed using an Excel spreadsheet with criteria that reflected the content of the policy. Data were entered by the auditors onto an Excel spreadsheet as they completed each set of case notes. Data were analysed at the end of each month and summarised at the end of the six months.

Validity and reliability

The auditors met to discuss interpretation of the criteria to ensure these were understandable and unambiguous. Changes to the wording of some criteria were made and definitions were checked against the policy. To test for inter-rater reliability, a trial run of the data collection tool against 10 sets of medical records took place with all auditors together in one room. This enabled them to cross check interpretations against the policy and with fellow auditors. Definitions were validated and minor modifications were made to the audit tool. This ensured consistency and stability of the audit tool.

Ethical considerations

The audit was conducted within an ethical framework which included, maintaining patient and staff confidentiality, anonymising information contained in the project final report, not collecting unnecessary data, destruction of data collection forms once they had served their purpose for the audit. The proposal was approved by the DHB Women's Health Service (WHS) clinical audit committee, business manager and medical clinical director.

Data analysis

Simple descriptive statistics (frequencies/percentages), dichotomous measures (Yes/No) and outcome measures using the categories of 'Always/Sometimes/Never' were used for data analysis. These measurements applied to situations where an assessment and the recording of it were required more than once.

FINDINGS

For the analysis, 'caregiver at the time of booking' was used. Caregiver categories described in the DHB annual clinical reports i.e self-employed midwife LMC, medical LMC with self-employed midwife (shared care), medical LMC with hospital midwife (shared care), hospital primary team (hospital midwifery LMC) and hospital high risk team care were used. Of the 193 medical records analysed the spread of caregivers was representative of the 2006 DHB figures as revealed in Table 1. Medical records from across the DHB's three campuses were included in the audit and were representative of the percentage of births across these three settings and levels of care.

Choice of monitoring: Electronic fetal monitoring included admission CTG, intermittent EFM and continuous EFM (CEFM) The data collection around EFM was not mutually exclusive. Some women had an admission CTG and continued on with CEFM, others had intermittent auscultation (IA) and moved onto CEFM. Measured against the indications for EFM from the policy, 37.3% of women in this audit had no indications for EFM. Of women without indications for EFM 54.1% received IA. Induction or augmentation of labour and epidural were the most common indicators for use of EFM (Table 2).

Admission CTG: Nearly 45% of women in the audit had an admission CTG regardless of antenatal 'risk' status. Seventy-one percent of the women who had an admission CTG had indications for intrapartum EFM according to the policy and 57% of these women went on to have CEFM. Of the women considered 'low risk', 37.5% had an admission CTG.

Intermittent Auscultation (IA): Of the women eligible for IA (no risk factors for EFM) 54.1% had IA of the fetal heart rate during labour. Analysis of IA method was based on the documentation of frequency, timing and duration as outlined in the policy using the descriptors "Always", "Sometimes" or "Never".

In relation to frequency of IA (every 15 to 30 minutes) documentation revealed this was achieved "Always" 71% of the time in first stage, 38% of the time in second stage, but only 10% of the time in relation to duration (for one minute) and 23% for timing (after a contraction). Recording of the maternal pulse rate in first and second stage failed to reach optimal frequency as outlined in the policy (Table 3).

Of the women with no risk factors for EFM and who were monitored using IA, 79% had normal vaginal births, 4% had assisted births, and 2.7% had an emergency CS (no outcome data were provided on the audit sheets for 10 women). A majority of babies had Apgar scores of nine or 10 at one minute.

Documentation standards for use and management of fetal monitoring equipment: There were 95 episodes of CEFM. Analysis was based around the frequency of compliance with the standards for use and management of fetal monitoring equipment and CTGs i.e. correct use of the equipment, identification of the woman, date and time of the episode of monitoring and secure storage of CTGs. The responses were Yes/No expressed as percentages (Table 3). Approximately 30% of all CTG traces in this audit had incorrect date and time settings, 20% did not use the tocograph (to record contractions). The name of the woman undergoing monitoring was absent on 18% of CTG traces and 28.5% of CTGs had no NHI number (unique identifier) on them either. From a medico-legal aspect it was interesting to note 11.6% of CTGs were not held securely in the medical record (Table 3).

Documentation standards for CTGs

This analysis relates to a standardised approach for documentation on CTG traces in relation to events (e.g. vaginal examination, epidural top-up) that may affect the fetal heart. Annotation of maternal observations and opinions expressed by colleagues who were asked for comments on traces are required to enable a consistent approach to interpretation of CTGs. In each instance, compliance was less than optimal (Table 4).

Documentation of findings on CTG

The policy outlines two methods for the interpretation of the CTG. One method, the mnemonic, "DR C BRAVADO" from the Advanced Life Support in Obstetrics (ALSO) course (AAFP, 2001) provides a systematic approach to the assessment of CTGs. However, in this audit documentation revealed the mnemonic was only used in 12.6% instances of assessment. The alternative is to use an interpretation framework where all four fetal heart features (baseline rate, variability, accelerations and decelerations) are

Table 1: Distribution of Place of Birth and Caregiver at Booking.

Data source	Place of Birth			Caregiver at Booking				
	Level 2/3 unit	Level O unit	Level O unit	LMC MW[a]	Dr & SE MW[a]	Dr & Hosp. MW[a]	Hosp. Primary Team[a]	Hosp. Sec/ Tert Team[a]
193 Audited casenotes	168 87%	14 7.3%	11 5.7%	135 69.9%	17 8.8%	22 11.4%	13 6.7%	6 3.1%
DHB 2006*	90.5%	6.4%	3.3%	66.3%	6.8%	12.8%	6.4%	7.7%

[a] Code: LMC=Lead Maternity Carer, MW=midwife, SE MW=self-employed midwife, Sec/Tert = secondary/tertiary

*Data source: Fisher, Hawley, Hardwick and Plunkett, 2006.

Table 2: Indications for intrapartum EFM

AN Maternal = 22	Elevated BP	8
	PET	2
	Diabetes	2
	APH	0
	Other	10
AN Fetal = 27	IUGR	3
	Premature labour	3
	Oligohydramnios	4
	Abnormal Doppler	1
	Abnormal CTG	1
	Rh disease	1
	Fetal anomaly	0
	Twins	3
	Breech	0
	42 wks + gestation	1
	Other - Large for dates, PROM, Non-reassuring CTG x 2, not stated x 6	10
Intrapartum – Labour = 78	Previous CS	13
	SRM >24hrs	9
	Induction of labour	22
	Augmentation of labour	24
	Hyper stimulation	2
	1st stage > 12hrs	0
	2nd stage > 2hrs	1
	Other - Augmented labour, Started IA then moved to CEFM, IOL became El CS, not stated x 4	7
Intrapartum – maternal = 23	Vaginal bleeding	0
	Sepsis	1
	Epidural	21
	Temperature > 38 degrees	0
	Other - Mitral valve prolapse, not stated x 1	2
Intrapartum – fetal = 18	Meconium liquor	6
	Blood in liquour	0
	Suspicious CTG	9
	Other - Variable decelerations quick labour, not stated x 2	3

assessed and a standardised language to categorise the findings (reassuring, non-reassuring and abnormal) is employed to ensure consistency of understanding. The collective fetal heart rate findings are then described as normal, suspicious, or pathological. Use of these interpretation and classification guidelines in the documentation were assessed using the descriptors "Always", "Sometimes" or "Never".

Documentation of the baseline fetal heart rate was noted as achieved "Always" 40% of the time, 25% of the time for variability, 15% of the time for accelerations, and 20% of the time for decelerations (Table 4). As demonstrated in Table 4, evidence of categorisation and description of the findings was less than optimal.

DISCUSSION

In this audit 37.3% of women had no indications for electronic fetal heart rate monitoring and were eligible for IA. However, only 54% of these women were actually monitored by IA. The remainder had some form of EFM. The birth environment has a part to play in the selection of fetal heart rate monitoring modality. Despite the fact that research and professional body guidelines for fetal heart rate monitoring recommend IA as the most appropriate method of fetal heart rate monitoring for women who are well and have had uncomplicated pregnancies (NICE, 2001; Liston et al, 2007; RANZCOG, 2006; MIDIRS, 2003, RCM, 2005; NZCOM, 2002: ACNM, 2007), it is apparent that the presence of technology within the hospital birth setting and the spoken or unspoken pressure from medical colleagues for the use EFM for all women influences midwive's practice and choices in monitoring modality. It is also acknowledged that intrapartum fetal heart rate monitoring often features in the reports from complaint and disciplinary bodies, which must have an impact on the choices made for intrapartum fetal heart rate monitoring. It would seem that in 2009 the quote from Boylan (1987) still holds true:

> *…it must also be emphasized that the method of fetal monitoring chosen may be strongly influenced by factors other than scientific evidence… where the medico legal climate is such that failure to rigorously document absence of fetal distress/true birth asphyxia may result in a harrowing lawsuit (p 73).*

There needs to be ongoing discussion and education to support the practitioner's initial assessment of risk factors in early labour to support decision-making about the most appropriate choice of monitoring modality.

Admission CTG

Nearly half of the women in this audit had an admission CTG. Thirty seven percent of the women

Table 3: Documentation standards for CTG's.

Yes	Right date on paper	Right time on paper	Right Speed 1cm/ min	Toco used	Woman's name	Woman's NHI*	Date noted	Time noted	Secured in notes
%	69.4	72.6	87.3	80	82.1	71.5	66.3	58.9	88.4

* NHI – National Health Index No. (unique identifier)

Table 4: Documentation standards for IA, CEFM, Interpretation and Classification of the 4 main FHR features

Documentation of IA Low Risk Women (n= 39)	Always		Sometimes		Never		No Data	Total	Total %
	No.	%	No.	%	No.	%	No. (%)		
Frequency IA 1st stage (15-30 mins)	28	71.8	6	15.4	4	10.2	1 (2.6%)	39	100
Frequency IA 2nd stage (5 mins or after every contractions)	15	38.5	13	33.3	6	15.4	5 (12.8%) moved to EFM or 2nd stage too quickly	39	100
Duration IA (1 minute)	4	10.5	Duration and Timing seldom documented						
Timing IA (after contraction)	9	23							
Maternal Pulse 1st stage	0	0	17	43.6	21	53.8	1	39	100
Maternal Pulse 2nd stage	0	0	0	0	35	89.7	4	39	100
Documentation CEFM (n=95)	**Always**		**Sometimes**		**Never**		**No Data**	**Total**	**Total %**
	No.	%	No.	%	No.	%	No. %		
Events	34	35.7	45	47.3	7	7.3	9 (9.5%)	95	100
Movements	19	20	25	26.3	43	45.2	8 (8.4%)	95	100
Maternal Observations	17	17.8	50	52.6	21	22.1	7 (7.4%)	95	100
Opinions	5	5.2	35	36.8	45	47.3	10 (10.5%)	95	100
DR C BRAVADO	6	6.3	6	6.3	77	81.1	6 (6.3%)	95	100
Baseline Rate	40	42.1	37	38.9	9	9.5	9 (9.5%)	95	100
Variability	24	25.3	47	49.5	16	16.8	8 (8.4%)	95	100
Accelerations	14	14.7	39	41.1	31	32.6	11 (11.6%)	95	100
Decelerations	20	21.1	44	46.3	15	15.8	16 (16.8%)	95	100
Categorisation	9	9.5	29	30.5	45	47.4	12 (12.6%)	95	100
Description	5	5.3	21	22.1	59	62.1	10 (10.5%)	95	100

*No Data means there was no documentation in the medical record.

who had an admission CTG had no indications for EFM. The current policy states, "There is no evidence to support the use of routine admission EFM in 'low-risk' women as this is poorly predictive of fetal compromise during labour (DHB policy, 2003). Over half of the women who had an admission CTG went on to have continuous electronic fetal monitoring (CEFM).

In keeping with the NICE (2001) guidelines for the use of electronic fetal monitoring, CEFM should be offered only to high-risk pregnant women. The difficulty has always been adequate identification of who is at high risk. A consequence of this difficulty is the increasing use of intrapartum admission CTG in order to identify which fetuses of low risk women are at greater risk and who therefore should have CEFM. The admission CTG, or the labour admission test (LAT) as it is sometimes referred to in the literature, was traditionally a CTG trace of 20-30 mins duration carried out on admission to the maternity ward. It is a screening test in early labour to detect compromised fetuses and to select the women in need of CEFM.

The main justification for admission CTG is that an abnormal trace might indicate a placental deficiency and hence identify potential fetal compromise at an early stage of labour in order to allow intervention (Imprey et al., 2003; Elimian et al., 2003). Gourounti and Sandall (2007) in a systematic review concluded that although the admission CTG may give an indication of fetal well-being at the time of admission it cannot predict how the fetus will cope after several hours of labour. Thus the admission CTG may represent an unnecessary intervention. A systematic review (Blix et al., 2005) revealed that women randomised to the LAT were more likely to have minor obstetric interventions like epidural analgesia, CEFM and FBS and concluded that there is no evidence supporting that the LAT is beneficial in low risk women. Whilst the admission CTG may be reassuring for the woman and her family and provide clinicians with evidence of monitoring, in the medico-legal sense, it is not recommended for low risk women as it is known to be associated with increased interventions. Women and their intrapartum caregivers should make an informed decision about using admission CTG based on knowledge of the woman's pregnancy and the initial assessment in labour.

Intermittent Auscultation (IA)

Most recommendations for fetal heart assessment using IA during labour are based on protocols used in randomized controlled trials (RCTs) that compared IA with EFM (Thacker & Stroup, 2000), and these guidelines have become custom and common practice in many birth settings.

Intermittent auscultation would normally be conducted at predetermined intervals. Those predetermined intervals are described in obstetric and midwifery texts, polices and guidelines as listening to the fetal heart rate every 15-30 minutes in the first stage of labour and every five minutes or after every contraction in the second stage of labour, and should be conducted for at least one full minute from the end of the contraction (RCOG, 2001; RANZCOG, 2006; RCM, 2005; ACOG, 1995 and Lister,2007). The RCOG (2001) guideline accords an A grading (at least one RCT as part of the literature of overall good quality and consistency addressing the specific recommendation) to the recommendations regarding frequency, timing and duration of IA, whilst RANZCOG (2006) accords a grading of C (evidence obtained from expert opinion and/or clinical experience of respected authorities - indicates an absence of directly applicable studies of good quality). The American College of Nurse-Midwives (ACNM) (2007) state that guidelines for intermittent auscultation based on evidence-based application during labour are not available. RANZCOG (2006) state that there have been no clinical studies comparing different IA frequencies to guide practice.

A recent survey researching NZ midwives' practice of taking maternal and fetal observations in normal labour (n=708) revealed that midwives are more likely (48%) to listen to the fetal heart every 30 minutes (28% every 15 minutes) in the first stage and after every contraction (40%) in the second stage (14.3% every five minutes) (Muir, 2006). In this current audit midwives are reported as ALWAYS meeting the criteria for monitoring in first stage (15 – 30 minutes) 71.8% of the time and every five minutes in second stage 38.5% of the time. Recording of the maternal pulse is poorly done in both first and second stage. During IA, the maternal heart rate should be ascertained by feeling the woman's radial pulse concurrent to auscultation the fetal heart rate with a Pinard's or Doppler device. This validates that it is the fetal heart rate, not the maternal heart rate that is being heard and counted (Goodwin, 2000).

These findings suggest that without robust evidence from research to inform frequency, timing and duration we only have the guidelines of 'custom and practice' to inform our practice. There needs to be research into the timing, frequency and duration of IA for low risk women (Feinstein, 2000). It is important for midwives to retain a broad knowledge base and clinical competence around the practice of IA and uterine activity assessment (Goodwin, 2000) as well as understanding the importance of taking the maternal pulse concurrent with IA.

Documentation standards related to Electronic Fetal Monitoring

Miller (2005) claims that allegations regarding the interpretation and management of FHR monitoring dominate obstetric litigation (in countries where litigation occurs) related to neurologically impaired infants. Therefore it is vitally important that the information contained on the CTG trace be accurate and that CTGs are stored securely for future reference. To this end a standardised language and consistent approach to interpretation of the findings of EFM is vital. The current policy states – "Any event that may effect the fetal heart rate should be noted on the EFM trace, signed and the date and time noted. Any staff member who is asked to provide an opinion on a trace should note their findings on both the trace and in the maternal case notes, together with the time and their signature" (DHB policy, 2003).

The study demonstrated deficiencies with documentation standards related to CTGs. Of concern was the high number of times when opinions (Never = 47%) were not documented in either the medical record or on the CTG (this relates to when it had been documented that an opinion was sought regarding the CTG). As well, a high number of CTGs did not have events (Never/ Sometimes = 64%) that may affect the fetal heart recorded on the trace. Events could be insertion or top-up of epidural or administration of narcotic, vaginal examination, artificial rupture of the membranes or syntocinon titration. The lack of documentation around opinions in particular is of concern. The guidelines for interpretation and classification provide an action plan. If clinicians are not documenting their opinions they are unlikely to be documenting their action plans either. Because CEFM is a screening tool, some form of verification of non-reassuring findings is required (Albers, 2001).

New Zealand midwives who provide expert midwifery opinion in the medico-legal context report being concerned at the large numbers of CTG traces that have the incorrect date, time and speed (personal communication, 2007). They also report that many of the CTG traces are not labelled adequately with the woman's name and unique identifying number (NHI number). Consideration of the impact of high acuity and staff shortages in our maternity units needs to be given to determine whether there any correlation with these findings.

This audit revealed that midwives and doctors are not meeting the practice standards for CTGs. There were a large number of CTGs with the incorrect date and time e.g. CTGs were automatically recording 04/04/44, 0001 hrs. This occurs when the batteries are not replaced. Once the machine is turned off, the date and time revert to factory settings. This is problematic when a review of the CTG is required at a later date. Some practitioners annotate the date and time on the CTG, however, the accuracy of this is debatable. Some medical records did not contain the

CTG traces at all. From a medico-legal perspective, it is vital that all CTG are stored securely in the notes. The audit reveals that this occurs 96% of the time. Our aim must be for 100% secure storage.

Documentation of findings on CTG

The literature demonstrates a lack of consistency and agreement in interpretation and classification of the findings of CTGs. Experts generally agree about the definitions of the normal FHR tracing and, at the other end of the spectrum, the FHR patterns which are predictive of current or impending fetal asphyxia. However most of the controversy exists in the interpretation of FHR patterns that lie between these two extremes and their presumed condition and clinical management (Parer, 1997). Parer and King (2000) suggested that an unwritten and undemonstrated aspect of FHR monitoring was the issue of reliable and reproducible interpretations of FHR patterns by health care professionals. Studies conducted into reliability and reproducibility show that although there is general agreement on patterns, inter-observer and intra-observer consistency is poor.

The adoption of a common language for FHR pattern interpretation and documentation that is agreed on and routinely used enhances communication between practitioners (Simpson & Knox, 2000). Simpson and Knox go on to say, "the chances of miscommunication between care providers, especially during telephone conversations about fetal status, are decreased when everyone is speaking the same language about EFM. Thus timely intervention during non-reassuring FHR patterns is more likely" (p.43).

Guidelines for the interpretation of CTGs are published by, amongst others, the RANZCOG (2006) and RCOG/NICE (2001). These need to be interpreted with due consideration to the clinical context. Practitioners who have trained through the Advanced Life Support in Obstetrics [ALSO] (AAFP, 2001) course may wish to utilize the "DR C BRAVADO" mnemonic (DR – describe risk, C – contractions, BRA – baseline rate, A – accelerations, VA – variability, D – decelerations, O – overall assessment) to systematically review CTGs (DHB policy, 2003).

The study revealed that clinicians in this DHB only used DR C BRAVADO as a tool for interpreting FHR features 20% of the time. However, it is not known how many midwives and doctors have completed the ALSO course. The alternative interpretation framework to use recommends an assessment of all four FH features (baseline rate, variability, accelerations and decelerations) and the use of standardised language (reassuring, non-reassuring and abnormal) to ensure consistency of understanding. All of these four features must be assessed alongside the presence and quality of uterine activity. The significance of EFM findings is useless in the absence of concurrent uterine activity monitoring.

The most illuminating finding of the study was the lack of overall description of CTGs. In the guideline, the descriptions (Normal, Suspicious, Pathological, Acute Fetal Compromise, Uterine Tachysystole and Hyper-stimulation) all have associated action plans to guide practitioners.

RECOMMENDATIONS

Midwives and doctors should receive annual joint education on fetal surveillance and CTG interpretation as a core competency standard for all staff involved in intrapartum care. Formal learning is complimented by annual completion of the computerised learning packages such as K2 fetal monitoring (http://training.k2ms.com) and the RANZCOG online fetal surveillance education programme (http://www.ranzcog.edu.au/fse_program/index.shtml) and weekly review of CTG strip presentations in Delivery Suite. Midwives would benefit from education in the techniques of intermittent auscultation and uterine palpation to re-ground them in normal physiology and help to improve confidence in this technique for well women and babies. A re-audit after the introduction of the standardised template for reporting CTG and a multidisciplinary education programme is recommended.

CONCLUSION

The policy for Intrapartum EFM employed at this DHB is a based around the RCOG/NICE 2001 guideline which has been robustly assessed against the evidence. This audit demonstrates that practitioners were not using the guidelines adequately or effectively and improvements could be made.

Globally it is known that inter-observer and intra-observer consistency is poor when it comes to interpretation of the findings of CTGs. The implications of this lack of consistent use of standardised language and interpretation of the findings of EFM is that the effectiveness of FHR monitoring as a reliable screening tool is weakened

Table 5: A standardised template for reporting CTGs

CTG Date:	CTG Time:	Maternal Pulse:	
Determine Risk CTG Indication	Low	Medium	High
Contractions:	…… in 10 mins Mild / Medium / Strong		
Baseline Rate:	Reassuring • 110 - 160	Non-Reassuring • 100 – 109 or 160 -180	Abnormal • < 100 or > 180
Variability:	Reassuring • > 5 bpm	Non-Reassuring • < 5 bpm > 40 mins and < 90 mins	Abnormal • < 5 bpm > 90 mins
Accelerations: _ 15 bpm lasting > 15 secs	Reassuring • Present	Non-Reassuring • Absent	Abnormal • Absent
Decelerations:	Reassuring • No decelerations	Non-Reassuring • Early, Variable, Single prolonged < 3 mins	Abnormal • Atypical variable, Late, Single prolonged > 3 mins
Overall Assessment:	Normal • All 4 features reassuring	Suspicious • 1 non-reassuring feature • Consultation Required	Pathological • 2 or more features non-reassuring or abnormal • Urgent Consultation
Comments: Plan:	Continue CTG	Review in …	
Signature:	Print Name:		

(Parer & King, 2000; Simpson & Knox, 2000). This DHB's policy used a standardised language and interpretation framework to assist and guide action, but compliance was not adequate. The authors believe that the introduction of a standardised template for CTG assessment, interpretation and action planning (based on the policy in use at the DHB) (Table 5) will contribute to improved practice and outcomes. The template is in the form of a sticky label which is filled in and placed in the woman's medical record every time the CTG is assessed. It is important that midwives and doctors are educated to use these intrapartum fetal monitoring guidelines and the reporting template. Consistency in interpretation comes from regular education sessions/updates. Greater consistency comes from having a shared understanding.

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