

OBSTETRICS

Impact of a comprehensive patient safety strategy on obstetric adverse events

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BACKGROUND AND OBJECTIVE

With the hypothesis that a multifaceted approach to enhance the overall safety climate would reduce the rate of adverse outcomes, we partnered with our hospital (Yale–New Haven Hospital, New Haven, CT) and our malpractice carrier to assess and improve our safety climate. The goal of this program was to improve patient safety, decrease patient injury, and decrease liability losses through a program that identified and initiated specific risk-reduction clinical practices and created a comprehensive culture of safety.

MATERIALS AND METHODS

This program was initiated as a quality assessment and improvement activity and consisted of an initial independent assessment of the service, followed by a series of interventions.

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★ EDITORS' CHOICE ★

OVERVIEW

A comprehensive obstetric patient safety strategy and improvements in maternal and perinatal adverse events.

Outside expert review

We began with a review of our obstetrical services by 2 independent consultants (a maternal–fetal medicine physician and a nurse specialist/leader), both experts in perinatal risk assessment and management and unaffiliated with Yale. The review and recommendations—focused on principles of patient safety, evidence-based practice, and consistency with the standards of professional and governing bodies—provided an outline with specific observations and recommendations for improvement.

Protocols and guidelines

In response to this review, we developed a series of protocols and guidelines delineating practice standards. These protocols and guidelines aimed to codify and standardize existing practices (eg, clarify the appropriate dosing of oxytocin).

Obstetrical safety nurse

To assist in data collection and facilitate planned interventions, we created the position of patient safety nurse. This nurse's main responsibility was to provide a formal method of evaluating clinical care and outcomes for our obstetrics services. To identify cases complicated by adverse outcomes and system weaknesses, the nurse led our anonymous event reporting system and on a daily basis reviewed triage, labor, and neonatal logs; met with charge nurses; and attended resident morning report. This nurse's methods of case ascertain-

ment were consistent throughout the period of this project. Beginning in September 2004, data were collected prospectively—on an occurrence basis—for an adverse event database of specified outcomes measures. Additionally, this nurse initiated and directed our programs in team training and electronic fetal monitoring (EFM) certification.

Anonymous event reporting

We activated a computerized tool for anonymous event reporting, allowing any member of the hospital staff to report anonymously events that in the opinion of the staff member may have caused harm to a patient or visitor.

The obstetrical hospitalist—Yale On-Call Attending

The role of Yale On-Call Attending (YOCA) and the description of his/her duties were initiated to provide a consistent system of inpatient coverage and resident supervision. In-house on-call attending services are provided 24 hours a day, 7 days a week, by the members of our maternal-fetal medicine section.

Obstetrical patient safety committee

This committee was formed in 2005 to define and track adverse events. With reference to these reviews, the committee addressed needs for protocols and policies.

Safety attitude survey/questionnaire

We implemented the Safety Attitudes Questionnaire (SAQ), a tool adapted from the aviation field and used for the assessment of health care employee perception of teamwork and safety.

Team training

We initiated a team training program based on crew resource management programs initiated and tested by the airline and defense industries. Led by our patient safety nurse, these 4-hour seminars included videos, lectures, and role playing

and always integrated a mix of individuals within the obstetrical team. Completion of the seminars was a condition for employment and/or clinical privileges.

EFM certification

To standardize EFM interpretation, our patient safety nurse initiated an institutional education program that included dissemination and review of National Institute of Child Health and Human Development guidelines, review of tracings, allocation of study guides, and voluntary review sessions. This training culminated in an exam. All medical staff and employees responsible for fetal monitoring interpretation were obligated to take this examination.

The effectiveness of these initiatives was assessed through the comparison of individual and composite adverse events over time. These events were compiled on a monthly basis from September 2004 through August 2007. Cases were collected as described above (see point 3 of “Obstetrical safety nurse,” section above). For the purposes of this report, cases underwent a second review for validation and coding by a second physician (C.M.P.).

The main outcome of interest was the quarterly composite adverse event rate, expressed as the number of deliveries (mothers) with associated adverse events per total deliveries for that 3-month period. The individual events included in the composite event total are the basis of the obstetrical Adverse Outcome Index (AOI) proposed by Mann and colleagues.

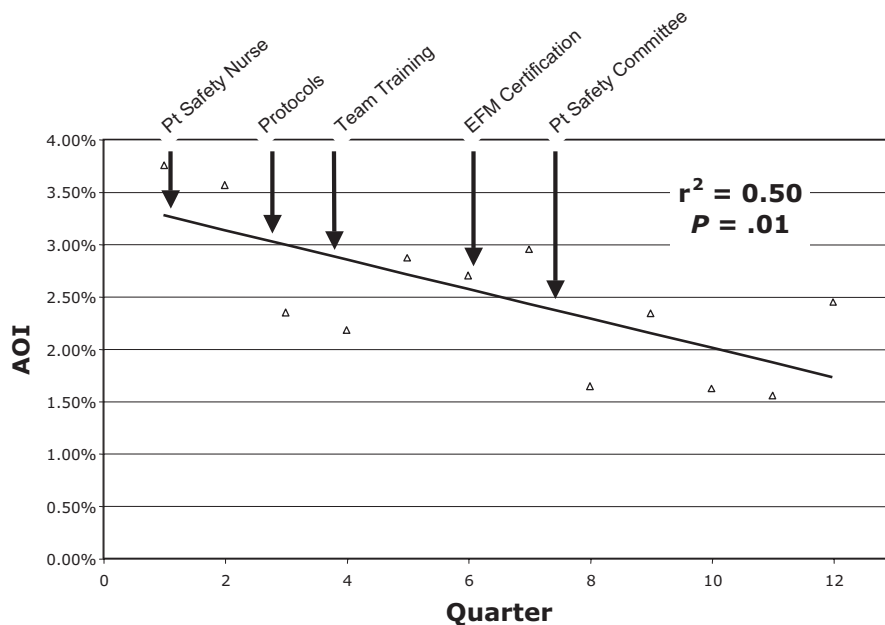
Beyond the components of the AOI, we also assessed other process variables (aspects of care related to quality, such as cesarean delivery and episiotomy rates) and reviewed each case of shoulder dystocia. Finally, we assessed results for our EFM training and changes in workplace safety perception based on the SAQ over the study period.

Data were analyzed by pregnancy, with multiple gestations classified as 1 delivery. Simple linear regression was used to evaluate the significance of the trend in quarterly AOI, cesarean delivery rate, and episiotomy rate.

RESULTS

A total of 13,622 deliveries occurred in the 36-month period from September 2004

FIGURE
AOI trend



Yale–New Haven Hospital, New Haven, CT (YNHH) quarterly obstetric (OB) Adverse Outcome Index (AOI).

EFM, electronic fetal monitoring; Pt, patient.

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through August 2007. The mean quarterly AOI over this period was 2.50% (SD \pm 0.72%; range, 1.55–3.75%). When calculated monthly, mean AOI was 2.49% (SD \pm 0.86%; range, 0.75–4.58%). A statistically significant decrease in the AOI was seen over the study period ($r^2 = 0.50$, $P = .011$) (Figure). This trend was still significant when the AOI was calculated on a monthly basis ($r^2 = 0.33$, $P < .001$). The mean quarterly AOI for the first half of the initiative ($2.90 \pm 0.64\%$) was also significantly different from that for the second half ($2.09 \pm 0.57\%$) (Student *t* test, $P = .04$).

For the most common marker, third- and fourth-degree lacerations (quarterly mean, 18; SD \pm 4.2), there was no statistically significant change over time ($r^2 = 0.11$, $P = .30$). No individual component of the AOI was seen to increase over time. With respect to major obstetrical quality measures not included in the AOI, our mean cesarean delivery rate was 35.1% (SD \pm 2.1%) and the episiotomy rate was 10.9% (SD \pm 1.5%). Of note, the cesarean delivery rate showed a significant increase over time ($r^2 = 0.50$, $P = .01$) and the epi-

siotomy rate showed a significant decrease over time ($r^2 = 0.50$, $P = .01$). We had a total of 81 episodes of shoulder dystocia, with a rate of 5.95/1000 deliveries (SD \pm 2.3); there was no statistically significant change in this rate over time.

From 2004 through 2007, the percentage of respondents reporting a “good teamwork climate” and a “good safety climate,” as assessed by the SAQ, improved from 38.5% to 55.4% and 33.3% to 55.4%, respectively. Over this same time period, perceptions among nurses and physicians of a “good teamwork climate” improved from 16.4% to 88.7% and from 39.5% to 72.7%, respectively.

COMMENT

We report a novel and diverse array of patient safety interventions, with evidence of success at reducing adverse events, using an adverse outcome assessment tool (the AOI). Our initial composite adverse event rate was comparable to, if not lower than, previously reported rates. We believe that a combination of

evidence-based standardization, enhancements in communication, and a dedicated patient safety nurse are the integral components of this effort.

We acknowledge that our comprehensive approach may not be applicable in all settings. Yale–New Haven Hospital is a large academic center with sufficient resources to support many simultaneous interventions, some of which are relatively costly. Our malpractice liability carrier supported the cost of the outside expert review, our patient safety nurse, her initial training in crew resource management training education, the SAQ,

and the EFM exam. Initial costs of the program are estimated at \$210,000, with ongoing yearly costs of \$150,000. This investment is dwarfed by the average payment (\$500,000–\$1,900,000) for just 1 obstetric liability claim.

Our efforts at performance improvement are still nascent, and we acknowledge that our service remains subject to adverse outcomes. We believe that continued application of these and similar strategies can have a further impact on safety. More work is necessary to establish benchmarks and best practices for obstetrical care. This report is one of the early steps in this process.

CLINICAL IMPLICATIONS

- A systematic and comprehensive approach to patient safety can have a significant impact on the risk of adverse events while simultaneously improving staff perception of teamwork and safety.
- Evidence-based standardization, enhancements in communication, and a dedicated patient safety nurse are integral components to a patient safety improvement project.
- The Adverse Outcome Index is a valid measure for tracking adverse events. ■

The pregnancy and long-term neurodevelopmental outcome of monochorionic diamniotic twin gestations: a multicenter prospective cohort study from the first trimester onward

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BACKGROUND AND OBJECTIVE

Vascular anastomoses cause monochorionic twin pregnancies to have a greater risk of death than their dichorionic counterparts. Monochorionic twins are most likely also at increased risk for neurologic morbidity. However, data on neurodevelopmental outcome are cur-

OVERVIEW

In monochorionic twin pregnancies, the mortality rate is about 8% and neurodevelopmental impairment occurs in 10% of infants.

rently not available. The purpose of this study was to document the pregnancy and neurodevelopmental outcome of a prospective series of monochorionic diamniotic twins included in the first trimester and to identify risk factors for death or impairment.

MATERIALS AND METHODS

Cases were recruited from January 2002 to October 2005 and carried out in 3 European centers. Patients were seen in 1 of the 3 centers for ultrasound examinations at 11–14, 16, 20, and 26 weeks. Information on the pregnancy and neonatal outcome was obtained from the referring clinicians. Developmental assessment was performed with the use of the Bayley Scales of Infant Development.

Neurodevelopmental impairment was defined as the occurrence of cerebral palsy, a developmental score < 2 SD, bilateral deafness, or blindness.

RESULTS

From January 2002 through October 2005, 136 monochorionic diamniotic

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