Changing Labor and Delivery Practice: Focus on Achieving Practice and Documentation Standardization with the Goal of Improving Neonatal Outcomes

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Objective. To establish multifactorial shoulder dystocia response and management protocol to promote sustainable practice change.

Data Sources/Study Setting. Primary data collection was conducted over 3 years. Implementation of the protocol spanned 13 months. Data collection occurred at five sites, which were chosen for their diversity in both patient mix and geographical location.

Study Design. Case study evaluation methodology was used to examine clinician engagement and protocol adoption.

Data Collection Methods. The training completion for all practice engagement team activities was collected by the site project manager and entered into a flat file. Data from the labor and delivery notes, medical records, and interviews with labor and delivery teams were gathered and analyzed by the senior investigator.

Principal Findings. In the first year, there was a threefold increase in shoulder dystocia reporting, which continued in years 2 and 3. In the first year, 96 percent of clinicians completed all training elements and in subsequent years, 98 percent completed the follow-up training. Overall teams reached a 99 percent adoption rate of the shoulder dystocia protocol.

Conclusions. System and site management teams implemented a standardized shoulder dystocia protocol that fostered effective teamwork and obstetric team readiness for managing shoulder dystocia emergencies.

Key Words. Shoulder dystocia, guidelines, adherence

Shoulder dystocia is a rare and unpredictable complication of vaginal birth that may result in serious and costly consequences for patients, families, clinicians, and society (Baxley and Gobbo 2004; Aasland and Forde 2005; Oskay et al. 2012). Safe delivery of the neonate during a shoulder dystocia event

requires the obstetric team to collaborate in employing evidence-based obstetric maneuvers to resolve the shoulder dystocia (Athukorala, Middleton, and Crowther 2006). Education and teamwork training have been shown to improve patient outcomes and physician performance during shoulder dystocia events (Deering et al. 2004; Crofts et al. 2005, 2008; Grobman et al. 2011; Inglis et al. 2011; Riley et al. 2011). Nevertheless, clinical response to shoulder dystocia often remains suboptimal due to a lack of clinician education, indecisive or untimely response, poor communication, and the lack of effective teamwork (Evans-Jones et al. 2003; Grobman et al. 2010). Improving perinatal clinical practice requires a multifactorial intervention to address each of the skills utilized in an appropriate response, as well as system-level support to maintain clinician training and readiness (French et al. 2012; Vaughan et al. 2012).

Instituting quality improvement interventions remains challenging; a considerable gap exists in the medical industry's ability to assimilate and disseminate practice improvement information in an effective and timely manner (Smith et al. 2012). Indeed, most studies of the implementation of clinical care guidelines report only modest to moderate improvement in clinician adherence (Grimshaw et al. 2004). Simply providing information to clinicians rarely impacts clinical practice, and physicians are typically not required to demonstrate learning from educational programs (Avorn and Fischer 2010). Rather, physician performance depends on health care system factors and organizational processes must change in order to achieve and maintain desired clinician behaviors and patient outcomes (Berwick 2003). Because health care systems are complex and diverse, there are many barriers that prevent implementation of evidence-based care (Shojania and Grimshaw 2005). In addition, although evidence-based clinical care guidelines exist, there are sparse evidence-based methodologies for their implementation (Grimshaw et al. 2004; Grol and Wensing 2004; Davies, Walker, and Grimshaw 2010). Controversy regarding the utility of addressing individual barriers to practice

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change further contributes to confusion regarding the efficacy of any given approach (Green et al. 2007; Baker et al. 2010). In addition, factors influencing the sustainability of practice change are poorly understood (Hovlid et al. 2012). For all of these reasons, examples of effective and sustainable practice change are rare (Smith et al. 2012).

This case study describes the implementation of the shoulder dystocia protocol and evaluation of the implementation and sustainability of the desired practice changes at five Ascension Health labor and delivery study sites. This study was supported by Ascension Health and in part by a 3-year grant from the Agency for Healthcare Research and Quality (AHRQ).

MATERIALS AND METHODS

Ascension Health is the largest nonprofit health system in the United States and the world's largest Catholic health system, providing care to almost 700,000 hospitalized patients per year. As part of its Journey to Zero preventable injuries, Ascension Health launched eight priorities for action in 2003, one of which included perinatal safety. This initiative included adopting standardized order sets to ensure appropriate use of oxytocin, implementing a tool known as SBAR (Situation, Background, Assessment, Recommendation) to improve communication among the multidisciplinary team, and providing education to obstetrical practitioners and nurses on Electronic Fetal Monitoring (EFM) and simulation and TeamSTEPPS, which focused on obstetric emergencies. This initiative led to significant improvements in perinatal safety, including a 93 percent decrease in birth trauma and an 8.1 percent reduction in rates of early elective delivery (Agency for Healthcare Research & Quality [AHRQ] 2008, updated 2013; Mazza et al. 2007). The rate of maternal injuries was also reduced. By September 2011, the rates of third- and fourth-degree lacerations at one member hospital were 3.8 and 0.8 percent, respectively, compared with national averages of 5.5 and 1.7 percent (AHRQ 2008, updated 2013). The incidence of shoulder dystocia and associated injuries, however, remained unchanged and injuries associated with shoulder dystocia represented one-third of all obstetric malpractice claims.

Analysis of shoulder dystocia events in 43 obstetric units completed in 2010 revealed three areas of opportunity for system and practice improvements. First, a survey of the obstetric units confirmed that each unit had a variation in both the response and management of shoulder dystocia occurrences. As an example, a majority of practitioners did not inform their labor and

delivery team that a shoulder dystocia emergency was occurring, and many of the practitioners were unaware of which maneuvers were recommended in response to a shoulder dystocia occurrence. Second, retrospective medical record review in 2010 revealed that shoulder dystocia events were underreported to the adverse event reporting system and medical record documentation for those events was incomplete, inconsistent, and illegible within the delivery record. The discovery of incomplete reporting and documentation suggested lack of familiarity with documentation guidelines, such as documented times for onset of shoulder dystocia and each maneuver that was attempted, as well as in what order they were performed. Other barriers to clinician compliance also existed. For example, the absence of a common documentation platform between hospitals in the same system further contributed to inconsistent documentation of perinatal adverse events and prevented comparison between institutions within the system. Third, interviews with risk management teams and labor and delivery practitioner leaders revealed that accountability structures concerning obstetrical practitioner performance existed at some hospitals and not at others. In some locations, obstetrical practitioners and managers were unaware of clinician performance data, preventing effective peer review feedback.

To address the variation in shoulder dystocia practices and attain the desired documentation, clinical interventions, a response and management protocol was created by obstetric and nursing experts from across the Ascension Health system. The response and management protocol was embodied in didactic and teamwork education in shoulder dystocia, including interdisciplinary simulation training and the shoulder dystocia response and management protocol.

Study Sites and Interventions

Five study sites within Ascension Health were selected for implementation of the shoulder dystocia response and management protocol. Columbia St. Mary's in Milwaukee, Wisconsin, had 32 obstetricians and family practice physicians on staff and 38 private obstetricians, family practice physicians, and midwives. They delivered approximately 2,900 newborns annually. Sacred Heart of the Emerald Coast, Miramar Beach, Florida, had four staff and one private obstetrician and delivered approximately 1,000 newborns annually. Saint Agnes Hospital, Baltimore, Maryland, had 34 obstetricians and midwives on staff and nine private obstetricians. They delivered approximately 2,000 newborns annually. St. John Hospital and Medical Center,

Detroit, Michigan, had 13 obstetricians, 5 family practice physicians, and 2 physician assistants on staff, and 32 private obstetricians and midwives. They delivered approximately 3,200 newborns annually. St. Vincent's Hospital, Birmingham, Alabama, had 29 private obstetrical practitioners and delivered approximately 3,800 newborns annually. Institutional Review Board approval was obtained from each of the five testing sites and on behalf of the Ascension Health system. Testing sites were chosen to reflect diversity in geography, patient demographics, historical occurrences of events, birth volume, and medical staff models. Site selection was also influenced by the availability of a local obstetrical practitioner champion to lead the project. At the time, Ascension Health did not have a standardized, single, system-wide electronic medical record, and each hospital had their version of medical record forms. Shoulder dystocia was included in the study's obstetric "trigger list" that defined unexpected events requiring specific site actions, and a standardized documentation process was introduced at each institution concurrently so that perinatal adverse events, near misses, and clinician responses were recorded in a standardized and timely manner.

System-level leaders from Ascension Health's Clinical Excellence and Risk Management Departments, as well as clinicians from the five testing sites, created the evidence-based shoulder dystocia protocol using high reliability principles (Weick and Sutcliffe 2001). The shoulder dystocia response and management protocol encompassed five different elements (Table 1): adoption of the American College of Obstetrics and Gynecology (ACOG) definition of shoulder dystocia (Sokol and Blackwell 2003), an Ascension Health shoulder dystocia protocol, didactic education in shoulder dystocia management, TeamSTEPPS teamwork and communication training (AHRQ 2012), and interdisciplinary simulation training. Other components of the program included improved documentation of the team management steps for shoulder dystocia events, mitigating patient harm, and using clinical lessons to improve practice. An e-learning module on shoulder dystocia management (Advanced Practice Strategies, Boston, MA, USA) provided a portion of the didactic training to nurses and obstetrical practitioners. Clinicians received communication and teamwork training with the TeamSTEPPS program, an evidence-based system developed by AHRQ (Smith et al. 2012). A high-fidelity simulator, the Noelle high-fidelity birthing mannequin, was used in simulation training to consolidate education and improve teamwork and communication skills (Gaumard Simulators 2016). The initial unit-level team simulation for shoulder dystocia, which integrated TeamSTEPPS concepts, took approximately 1.5 hours to complete with an annual required refresher

Table 1: Ascension Health's Shoulder Dystocia Response and Management Protocol

1. Adoption of the American College of Obstetrics and Gynecology (ACOG) definition of shoulder dystocia: "A delivery that requires additional obstetric maneuvers following failure of gentle downward traction on the fetal head to affect delivery." (Sokol and Blackwell 2003)
2. Ascension Health shoulder dystocia protocol:
<ul style="list-style-type: none"> • Call out of "shoulder dystocia" by delivery provider initiates documentation in the shoulder dystocia delivery note and timing • A nurse tracks time with a digital timer and calls out every 30 seconds • Delivery provider requests one of several maneuvers, generally starting with McRoberts maneuver followed by suprapubic pressure, if needed • Additional maneuvers are employed until the shoulder dystocia is resolved or until a 3-minute limit is reached • At the 3-minute limit, the delivery provider communicates a decision to continue with maneuvers or move to an alternative delivery method (the protocol requires providers to consider urgent abdominal rescue) • The time of delivery of the body is recorded on the shoulder dystocia delivery note
3. Didactic education, shoulder dystocia management
4. TeamSTEPPS teamwork and communication training
5. Interdisciplinary simulation training using Noelle high-fidelity simulator

requiring the same time-frame. In addition, all labor and delivery nurses, physicians, and midwives completed a shoulder dystocia management e-learning module initially, and then on a biennial basis. The initial and biennial each took approximately 1.5 hours.

Implementation and Maintenance Plan

A Practice Engagement Team (PET) at each site facilitated introduction of the program and provided local oversight. The PET included an obstetrical practitioner principal investigator (PI), the obstetrics nurse lead, a risk manager, a project manager, and a medical coder. Each local PET educated the full obstetrics staff, supervised the program, and maintained ongoing communication with other study sites. The project managers served as the lead contact at each site, coordinated maternal and infant study enrollments, disseminated materials, and organized meetings. The project manager also collected clinician education and training data and ensured the accuracy of clinical documentation and coding by performing chart reviews of patients enrolled in the study. In preparation for their role as site trainers, the obstetrical practitioner PI and an obstetrics nurse lead at each of the five sites completed the TeamSTEPPS Train-the-Trainer education. Site trainers also conducted simulation training

using a Noelle mannequin. Obstetric team members completed an e-learning module on shoulder dystocia management, learned the Ascension Health shoulder dystocia response and management protocol, completed TeamSTEPPS training, and applied learning and teamwork in simulation training. Master trainers documented simulation training and debriefing to confirm behavior-based competencies of the team. Team training was tailored to each site, while maintaining consistency of care and standardization of documentation.

Participation was voluntary, but highly encouraged, for all labor and delivery nurses, physicians, and midwives. Each study site documented the number of clinicians who participated in the education and training and reviewed these metrics during a monthly conference call. Sites also shared challenges and successful strategies on the call. Reviewing participation and enrollment data in this way fostered iterative improvement of the program by sharing collective experiences and cultural variation between the five study sites (Figure 1).

RESULTS

The shoulder dystocia protocol was implemented from July 2010 through June 2011. During this time, 224 obstetrical practitioners, mid-level practitioners, and 349 nurses were trained on the new standardized protocol, completed the shoulder dystocia management e-learning module, and adopted the ACOG definition of shoulder dystocia. In addition, 243 obstetrical practitioners and 414 nurses completed the TeamSTEPPS and simulation training using NoelleTM high-fidelity birthing simulators. At the five testing sites, a total of 96 percent of obstetrical practitioners, mid-level practitioners, and nurses completed all training in the first year of the implementation. This rate of participation grew to 98 percent 2 years postimplementation. The system-wide adoption of the ACOG definition of shoulder dystocia, combined with utilization of the standardized shoulder dystocia delivery note, provided a mechanism for consistent reporting and documentation of shoulder dystocia deliveries. Review of the event reporting system, required delivery note, and medical record revealed that in the first year of the study, there was a threefold increase in shoulder dystocia reporting, representing 99 percent compliance in shoulder dystocia reporting by delivery providers. In addition, the review revealed that there were no undocumented shoulder dystocia events at any of the five testing sites in the year following implementation. However, 27

Figure 1: Management Organization Chart

percent of shoulder dystocia cases had incomplete charting concerning head-to-shoulder delivery time in the first 3 months postimplementation. In years 2 and 3, the testing sites sustained the 99 percent compliance rate.

Despite the diversity and differences in birth volume between sites, a high percentage and large number of obstetrical practitioners, mid-level

practitioners, and nurses at all five sites participated in the voluntary education and training. Sites observed some variation in clinician participation. For instance, one site had one independent obstetrical practitioner (of four total delivery providers) who did not participate in the shoulder dystocia training the first year it was offered, but it did participate in the second year. The project managers and PIs documented clinician completion of the shoulder dystocia e-learning module and other training elements. Clinicians who had not completed training received reminders from project managers and/or PIs regarding the importance of the program and the possible impact on patient safety.

DISCUSSION

Health care system culture can be a major determinant of clinician participation in safety improvement initiatives (Weaver et al. 2013), incident reporting, and system learning (Berwick 2003; Smith et al. 2012). Numerous variables contribute to a learning culture, including system and leader support (Smith et al. 2012), clear guidelines for incident reporting (Mahajan 2010), processes tailored to local conditions (Della Penna et al. 2009), and shared ownership of health care quality (Grol et al. 2007; Della Penna et al. 2009).

Standardizing clinical practice surrounding shoulder dystocia at Ascension Health required developing an adaptive response at two levels: (1) for clinical practice during shoulder dystocia events, and (2) for implementation of the program at diverse sites. Every shoulder dystocia event is unique and requires an adaptive response by the clinical care team; there is no standard response that can be prescribed and required of practitioners. However, several factors related to shoulder dystocia can be standardized, such as agreeing upon a shared definition of shoulder dystocia; calling out shoulder dystocia to create situational awareness when it occurs; calling out time intervals to keep the clinical team informed; improved documentation of shoulder dystocia events; and postevent debriefing to identify improvement opportunities. The shoulder dystocia response and management protocol provided structure, clinical practice parameters, and required clinical guideline adoption, but it did not dictate specific clinical response.

Similarly, the implementation and management plan was adaptive. Two types of adaptation are relevant to system-wide learning: adaptation

to diverse sites and adaptation over time. To individualize the program at diverse sites, specific training and education elements were required of clinicians, but local project managers structured program introduction methods, scheduling, and staff feedback. Site leaders understand local culture and local personnel and are more likely to identify impeding and promoting factors. Adaptation to locale considers the complex factors that comprise context, including physician-related (Flottorp et al. 2013) and organizational and systemic factors that vary across clinical practice areas and locations.

We found that including obstetrical leaders and clinicians in crafting the implementation plan contributed expertise regarding local cultural requirements and also created shared ownership between personnel throughout the system. Identifying dedicated clinical leaders at each site was an important aspect of creating local accountability and ownership. Shared ownership of quality is a strong factor in creating a learning culture (Grol et al. 2007). Beyond sharing methods and strategies system-wide, broadly instilling high reliability principles heightened staff awareness of the need to examine situations and outcomes with an attitude of mindfulness and inquiry (Weick, Sutcliffe, and Obstfeld 1999). As physicians participated in system-wide initiatives, they gained an increased understanding of system context and its influence on clinical practice (Hovlid et al. 2012). An increased appreciation of system-ness may broaden physician inquiry to include possible system contributors to adverse incidents (Hovlid et al. 2012). We found that our local obstetrical practitioner leaders were effective at influencing peers within their own hospitals as well as assisting teams at other hospitals to adopt the shoulder dystocia response and management protocol, especially as their collective input was utilized to inform practice changes. We also found that practitioner status as either employed by the hospital or in an independent practice did not influence their voluntary participation in the training and new documentation requirements.

In addition, we discovered that standardizing and simplifying data collection fostered implementation and permitted comparison between diverse sites while avoiding possible confounding influences of site context (Pattinson and Bergh 2008; Smith et al. 2012). By gathering and analyzing clinician training records, medical records, and adverse perinatal events, it was possible to spot gaps in training and to use adverse events and near misses as opportunities to discover practice or systemic issues that required attention. As a case study, there are limitations in our findings. The implementation was tested in

only five study sites and a lot could be learned from the spread of this initiative to additional sites.

We did learn that many variables that can be addressed at a system-level impact physician engagement in quality improvement initiatives. For example, clinicians are more likely to engage in programs that they believe will make a difference to patient care (Benn et al. 2009; Smith et al. 2012; Flottorp et al. 2013). The shoulder dystocia response and management protocol is evidence-based, multifactorial, targeted to specific gaps and clinician behaviors, and encompasses clinical care guideline-recommended practices. In addition, guidelines or interventions developed and endorsed by clinician target groups are more likely to be adopted (Grol et al. 2007; Francke et al. 2008). As practitioner participation was voluntary, it was important that frontline clinicians partnered in the development of the shoulder dystocia protocol, and opinion leaders advocated for the program during implementation. Two other variables should be considered as clinicians tend to avoid activities that they view as a waste of time, superfluous, or risky (Francke et al. 2008; Flottorp et al. 2013). First, guideline complexity impacts adherence and guidelines that are too complex impede physician engagement and may not be fully understood (Francke et al. 2008; Vaughan et al. 2012). The shoulder dystocia response and management protocol addressed care gaps and clinician training in the simplest and most time-conserving manner possible. Feedback following training was solicited from practitioners and documented, in order to further adjust the program where necessary. Second, being able to try new behaviors before using them in a clinical situation has been shown to strongly influence physician adoption of methods (Francke et al. 2008; Flottorp et al. 2013). During the implementation, a simulation training component allowed clinicians to hone teamwork and shoulder dystocia response and management protocol methods during a simulated obstetrical emergency. The implementation and management plan optimized variables that impacted practitioner engagement, including quality of evidence, clarity, cultural appropriateness, and guideline consistency (Flottorp et al. 2013), and provided structure for iterative improvement.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: The Agency for Healthcare Research and Quality (AHRQ) provided grant funding for the demonstration study (grant no. 1R18 HS19608-01).

Disclosures: None.

Disclaimers: None.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.