PATIENT SAFETY SERIES

Implementing an obstetric triage acuity scale: interrater reliability and patient flow analysis

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A 5-category Obstetric Triage Acuity Scale (OTAS) was developed with a comprehensive set of obstetrical determinants. The objectives of this study were as follows: (1) to test the interrater reliability of OTAS and (2) to determine the distribution of patient acuity and flow by OTAS level. To test the interrater reliability, 110 triage charts were used to generate vignettes and the consistency of the OTAS level assigned by 8 triage nurses was measured. OTAS performed with substantial (Kappa, 0.61 — 0.77, OTAS 1-4) and near perfect correlation (0.87, OTAS 5). To assess patient flow, the times to primary and secondary health care provider assessments and lengths of stay stratified by acuity were abstracted from the patient management system. Two-thirds of triage visits were low acuity (OTAS 4, 5). There was a decrease in length of stay (median [interquartile range], minutes) as acuity decreased from OTAS 1 (120.0 [156.0] minutes) to OTAS 3 (75.0 [120.8]). The major contributor to length of stay was time to secondary health care provider assessment and this did not change with acuity. The percentage of patients admitted to the antenatal or birthing unit decreased from 80% (OTAS 1) to 12% (OTAS 5). OTAS provides a reliable assessment of acuity and its implementation has allowed for triaging of obstetric patients based on acuity, and a more in-depth assessment of the patient flow. By standardizing assessment, OTAS allows for opportunities to improve performance and make comparisons of patient care and flow across organizations.

Key words: acuity, obstetric triage, patient flow

Most emergency departments in North America use triage tools to ensure that patients requiring acute care receive priority treatment and to determine which patients can safely wait.[1,2] The Canadian Triage and Acuity Scale (CTAS) was introduced in 1999 and revised in 2006 and 2008. It has been studied extensively and has high degrees of both reliability and validity.[2-5] However, CTAS includes only a small number of high acuity obstetric determinants that do not reflect the diversity of patients assessed in an obstetric triage unit.

Obstetric triage units face many of the same challenges that led to the development and implementation of triage scales in emergency departments. The need to address access to care and long wait times, to assess acuity and workloads, and to increase accountability for limited resources led the Canadian Association of Emergency Physicians to develop a clear system that triages patients consistently within an institution and allows for comparison between institutions.[6] The ability to triage, evaluate, and treat patients has been shown to reduce length of stay and increase patient satisfaction scores.[7]

At London Health Sciences Centre (LHSC), obstetric triage provides 24 hour a day urgent and emergent care for all pregnant women beyond 20 weeks' gestation from the London area and for tertiary referrals from the southwest region of Ontario. Before restructuring of the London hospitals, obstetric triage services were provided at 2 sites. In June 2011, all obstetric services in London were amalgamated at LHSC and approximately 11,300 patients were seen in the new obstetric triage unit in the first year. In planning for this amalgamation, we sought to better understand the volume and acuity in triage and to look for opportunities to improve the quality of care and patient flow. To facilitate this, the perinatal program at LHSC developed and implemented a 5-level acuity classification scale that reflected the variety of patients seen in the obstetric triage unit. The purposes of this study were to (1) measure the interrater reliability and validity of the Obstetric Triage Acuity Scale (OTAS) and (2) assess the distribution of acuity and patient flow by OTAS level.

Materials and methods

This study (17702E) was approved by the Western University Research Ethics Board on Feb. 10, 2011.

Interrater reliability

OTAS was modeled on the 5-category (1-Resusitative, 2-Emergent, 3-Urgent, 4-Less Urgent, 5-Nonurgent) CTAS tool.[2,3] The acuity color coding and goals for time to assessment were replicated. A comprehensive set of obstetric modifiers was developed to reflect the variety of presentations and indications for referral to obstetric triage (Figure 1). An expert review panel comprised of physicians and nurses reviewed the classification

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FIGURE 1
Obstetric Triage Acuity Scale (OTAS)

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OBCU Obstetrical Triage Acuity Scale (OTAS)

London Health Sciences Centre

OTAS	Level 1 (Resuscitative)	Level 2 (Emergent)	Level 3 (Urgent)	Level 4 (Less Urgent)	Level 5 (Non-Urgent)
Time to Secondary Health Care Provider	Immediate	≤ 15 minutes	≤ 30 minutes	≤ 60 minutes	≤ 120 minutes (2 hours)
Re-assessment	Continuous Nursing Care	Every 15 minutes	Every 15 minutes	Every 30 minutes	Every 60 minutes
Labour/Fluid	▪ Imminent birth	▪ Suspected preterm labour/PPROM < 37 weeks	▪ Signs of active labour > 37 weeks	▪ Signs of early labour/SROM > 37 weeks	▪ Discomforts of pregnancy
Bleeding	▪ Active vaginal bleeding with/without abdominal pain	▪ Bleeding associated with cramping (> spotting) < 37 weeks	▪ Bleeding associated with cramping (> spotting) > 37 weeks	▪ Spotting	
Hypertension	▪ Seizure activity	▪ Hypertension > 160/110 and/or headache, visual disturbance, RUQ pain	▪ Mild Hypertension > 140/90 with/without associated signs and symptoms		
Fetal Assessment	▪ Abnormal FHR tracing ▪ No fetal movement	▪ Atypical FHR tracing, abnormal BPP, abnormal dopplers ▪ Decreased fetal movement			
Other	▪ Acute onset severe abdominal pain ▪ Altered level of consciousness ▪ Cord prolapse ▪ Severe respiratory distress ▪ Suspected sepsis	▪ Major trauma ▪ Shortness of breath ▪ Unplanned and unattended birth	▪ Abdominal/back pain greater than expected in pregnancy ▪ Flank pain/hematuria ▪ Nausea/vomiting and/or diarrhea with suspected dehydration	▪ Ongoing assessment from outpatient clinic (for hypertension, blood work) ▪ Minor trauma (minor MVC/fall) ▪ Nausea/vomiting and/or diarrhea ▪ Signs of infection (ie. dysuria, cough, fever, chills)	▪ Anything that does not seem to pose threat to mother or fetus ▪ Cervical Ripening ▪ Outpatient placenta previa protocol ▪ Pre-booked visits (ie. Rh and progesterone injections, NST) ▪ Assessment for version ▪ Rashes

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Triage tool used in the primary nursing assessment to stratify patients and provide care based on acuity.

BPP, biophysical profile; *FHR*, fetal heart rate; *MVC*, motor vehicle collision; *NST*, nonstress test; *PPROM*, preterm premature rupture of membranes; *RUQ*, right upper quadrant; *SROM*, spontaneous rupture of membranes.

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system for accuracy and completeness of obstetric modifiers.

To assess the interrater reliability (IRR), an educational program was provided to all the triage nurses. Eight nurses were randomly selected and assigned triage levels to clinical scenarios based on actual patient visits. These scenarios were from randomly selected 4 hour time blocks (2 per day) from June 1, 2011, to Jan. 31, 2012. The short vignettes containing the initial set of facts presented to a triage nurse were incorporated into an online questionnaire using Survey Monkey. We measured interrater agreement using the weighted Kappa to account for multiple raters, multiple categories, and for similar classification by chance alone. The calculated sample size of 110 scenarios was based on a Kappa correlation level of 0.8, a confidence interval of 95%, and 8 raters.[8]

Validity

As an initial assessment of the validity of OTAS, admission to the birthing and antenatal units was determined from the chart review (Jan. 1, 2009 to Dec. 31, 2010) and used as a surrogate measure of resource use. The proportion of patients requiring admission was stratified by OTAS level to examine the relationship between the acuity level and hospital resource use.

Patient flow and acuity analysis

Before the 2011 merger, current state value stream maps of patient flow at St. Joseph's Health Care Centre (SJHC) and LHSC were developed. The maps outlined every task performed during a triage visit including all resources used