GENERAL GYNECOLOGY

Development and comparison of prognostic scoring systems for surgical closure of genitourinary fistula

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OBJECTIVE: The purpose of this study was to test the diagnostic performance of 5 existing classification systems (developed by Lawson, Tafesse, Goh, Waaldijk, and the World Health Organization) and a prognostic scoring system that was derived empirically from our data to predict fistula closure 3 months after surgery.

STUDY DESIGN: Women with genitourinary fistula (n = 1274) who received surgical repair services at 11 health facilities in sub-Saharan Africa and Asia were enrolled in a prospective cohort study. Using one-half of the sample, we created multivariate generalized estimating equation models to obtain weighted prognostic scores for components of each existing classification system and the empirically derived scoring system. With the second one-half, we developed receiver operating characteristic curves using the prognostic scores and calculated areas under the curves (AUCs) and 95% confidence intervals (Cls) for each system.

RESULTS: Among existing systems, the scoring systems that represented the World Health Organization, Goh, and Tafesse classifica-

tions had the highest predictive accuracy: AUC, 0.63 (95% CI, 0.57−0.68); AUC, 0.62 (95% CI, 0.57−0.68), and AUC, 0.60 (95% CI, 0.55−0.65), respectively. The empirically derived prognostic score achieved similar predictive accuracy (AUC, 0.62; 95% CI, 0.56−0.67); it included significant predictors of closure that are found in the other classification systems, but contained fewer, non-overlapping components. The differences in AUCs were not statistically significant.

CONCLUSION: The prognostic values of existing urinary fistula classification systems and the empirically derived score were poor to fair. Further evaluation of the validity and reliability of existing classification systems to predict fistula closure is warranted; consideration should be given to a prognostic score that is evidence-based, simple, and easy to use.

Key words: classification system, genitourinary fistula, observational study, receiver operating characteristic, surgery

Although garnering worldwide attention only in the past decade, female genitourinary fistula (an abnormal opening between the genital and urinary systems) is an ancient condition that is caused predominantly by obstructed labor. From the mid 19th century, when the first consistently successful surgical techniques for repairing genitourinary fistulas were developed, efforts have been made to develop a schema for the classification of fistulas.[1] At least 25 systems exist,[2] although the reliability and validity of most of them have not been empirically tested. Although there is widespread acknowledgment that a standardized classification system is needed,[2-6] disagreement remains about which fistula characteristics should be included and what purposes (eg, prognostic or descriptive) the system should serve.

The purposes of existing systems and the components that they include vary. They are used for didactic purposes, to facilitate communication and learning, and for planning and conducting repairs, which includes the assessment of prognosis and determination of the need for referral. Some systems, particularly older ones (eg, Sims,[1] Lawson[7]), describe the location of the fistula only. Others (eg, Goh,[8] Tafesse,[9] and Waaldijk[10]) are more detailed, describing the extent to which varying anatomic structures are affected and factors such as bladder and fistula size. The more detailed systems allow for a precise description of the fistula, with the implicit assumption that, as type increases by number or letter combination (eg, type 2Bb vs type 2A), the prognosis worsens. Indeed, the systems developed by Goh and Waaldijk

have been tested empirically to determine the extent to which their parameters predict repair outcomes.[11,12] An additional system presented by the World Health Organization (WHO)[13] classifies fistula on the degree of repair difficulty (simple or complex). However, to our knowledge, this system has not been validated nor is it currently used. None of the systems we are aware of are scoring systems, and none evaluate patient characteristics that include comorbidities.

These systems were developed with clinical judgment, rather than empiric

TABLE 1
Creation of variables that represent components of the compared classifications

Classification system		Classification system component	Variable used to operationalize component
Goh			
	Type 1	Distal edge of the fistula >3.5 cm from external urinary meatus	Urethral length >3.5 cm
	Type 2	Distal edge of the fistula 2.5–3.5 cm from external urinary meatus	Urethral length 2.5–3.5 cm
	Type 3	Distal edge of the fistula 1.5–<2.5 cm from external urinary meatus	Urethral length 1.5–<2.5 cm
	Type 4	Distal edge of the fistula <1.5 cm from external urinary meatus	Urethral length <1.5 cm
	a.	Size, <1.5 cm in the largest diameter	Available from dataset
	b.	Size, 1.5–3 cm in the largest diameter	Available from dataset
	c.	Size, >3 cm in the largest diameter	Available from dataset
	i.	None or only mild fibrosis (around fistula and/or vagina) and/or vaginal length >6 cm, normal bladder capacity	None or only mild fibrosis and normal bladder capacity[a]
	ii.	Moderate or severe fibrosis (around fistula and/or vagina) and/or reduced vaginal length and/or bladder capacity	Moderate or severe fibrosis and small bladder capacity
	iii.	Special considerations eg, after radiation, ureteric involvement, circumferential fistula,[b] previous repair	Ureteric involvement, circumferential fistula, previous repair
Lawson			
	i.	Juxta-urethral	Available from dataset
	ii.	Mid vaginal	Available from dataset
	iii.	Juxta-cervical	Available from dataset
	iv.	Vault	Available from dataset
	v.	Massive combination fistula[a]	Available from dataset
Tafesse			
	Class 1	Noncircumferential, not previously operated	Available from dataset
	Class 2	Noncircumferential, previously operated	Available from dataset
	Class 3	Circumferential, not previously operated	Available from dataset
	Class 4	Circumferential, previously operated	Available from dataset
	Urethral involvement		
	I.	No involvement (length, >4 cm)	Available from dataset
	II.	Urethra involved, but not middle 1/3 (length, 2.73.9 cm)	Available from dataset
	III.	Middle 1/3 partly involved (length 1.4–2.6 cm)	Available from dataset
	IV.	Middle 1/3 completely involved, but some urethral tissue remains (<1.4 cm)	Collapsed categories IV and V
	V.	No urethra	
	Bladder size		
	a.	Longitudinal diameter, >7 cm	Normal bladder
	b.	Longitudinal diameter, 4–7 cm	Small or no bladder
	c.	Longitudinal diameter, <4 cm	Small or no bladder

Frajzyngier. Prognostic scores for surgical genitourinary fistula closure. Am J Obstet Gynecol 2013.   (continued)