Evaluation of syndromic management for Chlamydia trachomatis in STI clinics in Bolivia

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Introduction

Syndromic management is the most common method for diagnosis of sexually transmitted infections (STI) in the developing world. For women, it is often neither sensitive nor specific in accurately identifying STI. Poor sensitivity is linked to the fact that most (50-75%) women have asymptomatic infections. Poor specificity is linked to the fact that many women who have vaginal discharge are suffering from derangement of vaginal flora (either bacterial vaginosis or candida).

At an epidemiological level, poor performance of syndromic algorithms results in over treatment (usually with antibiotics) in low prevalence populations and under-treatment in higher prevalence populations. This leads to the persistence of STI in high-risk "core groups" and the increased probability of the development of antimicrobial resistance among common STI pathogens.

Objective

To evaluate performance of syndromic management for diagnosis of Chlamydia trachomatis (CT) in comparison to PCR-based reference methods in a large sample of women in Bolivia.

Methods

In 2005, 1,762 adult women at high risk for STI were recruited at 4 STI surveillance center clinics in Bolivia in El Alto, La Paz, Cochabamba and Santa Cruz during 2005 (Figure 1). The overall goals of the study were to comparatively evaluate the performance of a new immunochromatographic rapid diagnostic for CT, the effects of a new sampling device on the performance of this rapid test, and ELISA and syndromic management as compared to PCR-based diagnostic results.

Figure 1. Boliva

After a written consent process, participants were interviewed about recent sexual history and any symptoms related to their clinic visit.

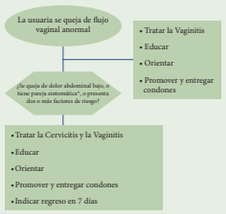
Syndromic Management

After collecting sexual and behavioral histories, the clinician carried out a three-part examination procedure. This included:

1) a clinical examination of lymph nodes, identification of any abdominal pain in the hypogastric area and iliac fossa, and hyperemia or pus in the urethral meatus;

2) a speculum examination for abnormal discharge, cervical hyperemia or pus, menstrual bleeding, or ectropion; and

3) a bimanual examination for right and left tubal pain or tumors, hypogastric pain, cervical pain with movement, and increased uterine volume.



* Su pareja presenta flujo uretral

** Factores de riesgo: a) menor de 21 años, b) más de una pareja sexual en los tres meses anteriores, y c) una nueva pareja en los tres meses anteriores

Figure 2. Syndromic management algorithm

The physician then made a diagnosis based on standard syndromic protocols for women who have vaginal symptoms commonly associated with (STI) (Figure 2).

A healthcare provider then collected three endocervical swabs: the randomized flocked or Dacron® swab for use with the PATH CT ICS test, a Dacron® swab for use with an ELISA test for Chlamydia (BioRad Chlamydia EIA) and an additional Dacron® swab for use with a reference PCR test for Chlamydia (Roche Amplicor CT/NG) (Figure 3).

Reference testing for CT, using Roche Amplicor CT/NG test, was carried out at the National Reference Laboratory (INLASA) in La Paz.

Statistical Methods

Sensitivity, specificity, negative predictive value (NPV), and positive predictive value (PPV) of the syndromic management algorithm was calculated by comparing the results with those of the PCR Roche Amplicor CT/NG test. Logistic regression was carried out with demographic and symptom variables to assess the association between these factors and CT positivity. The data are not shown in this presentation as no symptoms were significantly associated with CT positivity.

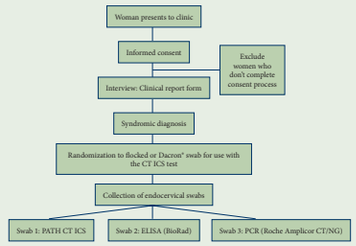


Figure 3. Study procedures

Results

1. This was primarily a young population engaged in risky sexual behaviors (Table 1).
2. Overall CT prevalence by PCR was 12.7% though it varied by location with the highest prevalence in Santa Cruz and El Alto (Table 1).

Table 1: Demographic and Sexual History Characteristics of Women Attending STI clinics in Bolivia

Variable	Percent or Value	Minimum Maximum if applicable or (95% CI)
Median Age	25	18, 66
Less than 3 Sexual Partners in Last 24 Hours	39.8%	
Self-Reported 100% Condom use in last 5 sexual episodes	47.5%	
Ever Diagnosed with an STI	33.1%	
Chlamydia Prevalence Overall (by PCR)	12.7% (224/1762)	(11.2-14.3)
Santa Cruz	13.8% (61/443)	(10.6-17.0)
Cochabamba	12.1% (51/423)	(9.0-15.2)
El Alto	14.1% (61/433)	(10.1-17.4)
La Paz	11.0% (51/463)	(8.2-13.9)

3. The most common symptoms observed by clinicians during examinations were abnormal discharge and abdominal pain in the hypogastric area (Table 2).

Table 2: Symptoms Detected by Clinicians via Clinical, Speculum, and Bimanual Examinations

Variable	Percent
Clinical Examination	
Enlarged inguinal lymph nodes	1.1
Abdominal pain-hypogastric	6.8
Abdominal pain-right iliac fossa	2.5
Abdominal pain-left iliac fossa	2.6
Urethral meatus-hyperemia	0.0
Urethral meatus-pus	0.3
Speculum Examination	
Abnormal discharge	36.9
Cervix-hyperemia	20.8
Cervix-pus	2.0
Menstrual bleeding	1.4
Ectropion	5.6
Bimanual Examination	
Right tube-pain	3.6
Right tube-tumor	0.1
Left tube-pain	3.2
Left tube-tumor	0.2
Hypogastric pain	9.0
Cervix (pain with movement)	1.2
Uterus (increased volume)	0.1

4. Syndromic management was 34.8% sensitive (95% CI 28.6.3–41.1) and 75.6% specific (95% CI 73.4–77.6) overall and varied considerably by location for CT when compared to PCR (Table 3).

Table 3: Performance of Syndromic Management for Chlamydia trachomatis (CT) in four urban locations

Location	Sensitivity %	Specificity %	PPV %	NPV %
Santa Cruz	39.7 (25/61)	82.5(314/382)	27.5 (25/93)	89.1 (314/350)
Cochabamba	39.2 (20/51)	76.7 (285/372)	18.6 (20/107)	90.2 (285/316)
El Alto	19.0 (10/61)	88.1 (331/372)	21.1 (10/51)	86.7 (331/382)
La Paz	45.1 (23/51)	56.3 (232/412)	11.3 (23/203)	89.2 (232/260

5. None of the symptoms detected during the syndromic management examination were associated with CT positivity when evaluated in multivariate logistic regression analyses (data not shown). Age and location of residence were the only variables associated with CT positivity.

Conclusions

1. Syndromic management was neither sensitive nor specific in this population. This points to the need for better point-of-care testing options in resource-limited settings.
2. Heterogeneity of syndromic management performance by location is suggestive of a need for retraining among providers in centers that see high-risk women. However, prior to the initiation of the study, we did conduct a 1 day "refresher course" with all clinicians to ensure some standard of understanding of the algorithm.
3. Symptoms measured via the examinations do not add significant predictive power to clinical decisionmaking in this context. Age and location were the only predictors of CT positivity in logistic regression analyses (data not shown).
4. Clinical history and clinician experience variables were not included in this analysis. Further research is necessary to evaluate the intersection of prior clinical experience, patient history, and current symptoms in clinical decision making.
5. Cost effectiveness studies must be carried out, that take loss to follow up and transmission of disease during the interval between specimen collection and testing into account, when comparatively evaluating syndromic management and the potential utilty of new diagnostic tests.

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