

AUDIT REPORT

Chlamydia trachomatis detection — is it doctor dependent?

L A Riddell MRCP and J Sherrard FRCP

Department of Genitourinary Medicine, Radcliffe Infirmary, Oxford OX2 6HE, UK

Summary: The accuracy of tests for chlamydia depends, among other things, upon the quality of the clinical specimen. Most chlamydia tests do not allow comment on specimen quality. It has been shown that examination of Papanicolaou stains or Diff-Quik stains of endocervical secretions can be used to assess the quality of endocervical sampling. This study has found that by analysing surrogate markers, such as the rates of inadequate cervical cytology and chlamydia detection rates in patients not identified as chlamydia contacts, it is possible to identify doctors performing less well in cervical sampling without the need for extra tests.

Keywords: *Chlamydia trachomatis*, endocervical sampling, diagnosis

INTRODUCTION

Chlamydia trachomatis is the commonest sexually transmitted bacterial infection in industrialized countries. In 1998 there were 44,196 cases of chlamydia infection reported by genitourinary medicine (GUM) clinics in England and Wales¹. Consequent upon the serious sequelae of infection, including pelvic inflammatory disease (PID), tubal infertility and ectopic pregnancy, increasing amounts of time and money are being focused on case finding and population screening in an attempt to reduce morbidity. A number of new diagnostic tests have been developed and an increasing number of samples are suitable for testing for the presence of *C. trachomatis*².

The accuracy of tests for *C. trachomatis* depends upon a number of factors including the test used, the site(s) sampled, transport conditions and the quality of the clinical samples.

As chlamydia is an intracellular pathogen the presence of cellular material is necessary to detect the organism. Even the most sensitive DNA amplification techniques can be affected by specimen adequacy as demonstrated by the presence of host cells². None of the DNA methods, enzyme-linked immunosorbent assay (ELISA), or culture allow comment on the sample quality. Among currently available tests for *C. trachomatis*, only immunofluorescence allows any qualitative assessment of the sample provided. It has been shown that it is possible to improve chlamydia detection rates by providing good clinical samples to the laboratory for testing.

Kellogg *et al.*^{3–5} have shown that examination of Papanicolaou stains or Diff-Quik stains of endocervical secretions could be used to assess the quality of endocervical sampling. These studies used an arbitrary cut off to define an adequate sample. Subsequently Beebe *et al.*⁶ have used a semi-quantitative cytological technique to evaluate specimen adequacy for *C. trachomatis* testing, showing a linear relationship between the number of cells observed on an endocervical smear and chlamydial positivity. All these studies relied upon a second sample being taken at the initial examination, and then being processed.

We undertook a study comparing the chlamydia pick-up rates between doctors working in a department of GUM. A number of surrogate markers were looked at to see if these might allow us to indirectly assess the quality of chlamydia sampling in female patients, without requiring any additional samples or tests being performed.

METHODS

A retrospective case-note review of all new female attendees at a GUM clinic from August 1999 was undertaken. The records of the first 100 consecutive female patients examined and tested for sexually transmitted infections by each doctor working in the clinic were studied.

Patients excluded were those not having an infection screen, those who had had antibiotics with antichlamydial activity in the previous 2 weeks, and women who had had a previous hysterectomy where endocervical sampling was not therefore possible.

At the clinic all females undergoing infection screens have samples taken from both the endocervix and urethra. These are tested for the

Table 1. Rates of inadequate smears and positive chlamydia tests in patients not identified to be at risk from their contact history by the doctor

Doctor	A	B	C	D	E	F	G	H	I	J	K
No. of 'unpredicted' positive chlamydia results. 100 tests per doctor	5	8	7	5	4	3	6	5	5	7	3
No. and % inadequate smears	0/57 0	1/59 1.7	2/67 2.9	1/55 1.8	1/63 1.6	6/69 8.7	0/47 0	1/56 1.8	0/74 0	0/53 0	6/58 10.3

presence of *C. trachomatis* using the Dade Behring ELISA with all positive results confirmed by immunofluorescence. The clinic protocol states that: 'As *Chlamydiae* are intracellular organisms, samples must contain cellular material for the diagnosis i.e. the swab must be rotated vigorously, at least 10 times, in the endocervix'.

Information was recorded as to whether the patient was a sexual contact of chlamydia, a sexual contact of non-specific genital infection (NSGI), and whether the patient had a clinical diagnosis of PID. Where cervical cytology had been undertaken, the adequacy of the sampling as commented on by the laboratory was noted. Cervical cytology is performed in the department on an opportunistic basis, in women who are due for or have never had a smear, those with external genital warts, and in women with an abnormal cervical appearance.

RESULTS

The notes of 1100 female patients examined by 11 doctors were included in the study. All doctors worked a minimum of 2 sessions per week in GUM and all had been working in the clinic for at least 12 months prior to commencement of the study.

The overall chlamydia positive rate among these patients was 7.5% (range 4–12%). One hundred and fifty-seven women (14.3%) were attending as sexual contacts of partners who had either had chlamydia or NSGI diagnosed, and all doctors saw a similar number of these patients (range 12–17%).

Approximately half of the women attending as chlamydia contacts were confirmed as having chlamydia and 8% of NSGI contacts were found to be chlamydia positive. All of these women received treatment with antichlamydial drugs because of their contact history.

Each doctor performed cervical cytology in between 50 and 74 of the women. All, except 2 doctors, had either one or no smears reported as being too scanty for assessment. Cytology that was not interpretable due to the slide being obscured by polymorphs or red blood cells were not considered inadequate as the presence of red blood cells has been used as an indicator of an adequate sample for the diagnosis of chlamydia³. Two doctors (F and K) had higher rates of scanty smears when compared with other doctors (Table 1) and both of these doctors also had lower rates of positive

chlamydia tests in patients not thought to be at risk from their contact history.

DISCUSSION

Both the sensitivity and specificity of diagnostic tests for *C. trachomatis* have been shown to be directly related to the adequacy of the specimen. The lack of specimen adequacy remains a serious shortcoming in many screening programmes and research studies. Studies have shown that clinicians must be trained in proper techniques and reassessed frequently². The use of a test, such as ELISA, with low sensitivity makes adequate sampling particularly important.

It has been demonstrated that by taking 2 samples from the endocervix simultaneously, one can be tested for chlamydia using a standard test and the second used to assess the specimen quality using a Papanicalou or Diff-Quik staining method. Analysis has shown that the specimen quality correlates with the chlamydia detection rate³⁻⁶.

We have identified a subgroup of doctors who had higher rates of inadequate cervical smears and lower than average pick up of chlamydia in women who would not otherwise have been treated (i.e. not chlamydia or NSGI sexual contacts). This study suggests that by using routinely available information, it is possible to identify clinicians whose endocervical sampling technique is less effective than that of others. This study shows that the use of surrogate markers, in particular inadequate cervical cytology may provide markers of doctors underperforming in cervical sampling. The relatively small numbers of chlamydia-positive women seen by each doctor make it difficult to draw firm conclusions, but these findings suggest that further monitoring should take place and if the trend continues it would allow identification of doctors who might benefit from skills updating.

References

- PHLS. Sexually transmitted diseases quarterly report: genital chlamydial infection, ectopic pregnancy and syphilis in England and Wales. *CDR Weekly* 2000;10:116-18
- Black CM. Current methods of laboratory diagnosis of *Chlamydia trachomatis* infections. *Clin Micro Rev* 1997;10:160-84
- Kellogg JA, Seiple JW, Murray CL, Levisky JS. Effect of endocervical specimen quality on detection of *Chlamydia*

- trachomatis* and the incidence of false-positive results with the Chlamydiazyme method. *J Clin Microbiol* 1990;28:1108-13
- 4 Kellogg JA, Seiple JW, Klinedinst JL, Levisky JS. Comparison of cytobrushes with swabs for recovery of endocervical cells and for Chlamydiazyme detection of *Chlamydia trachomatis*. *J Clin Microbiol* 1992;30:2988-90
- 5 Kellogg JA, Seiple JW, Klinedinst JL, Stroll E. Diff-Quik stain as an alternative to Papanicolaou stain for determination of quality of endocervical specimens submitted for PCR detection of *Chlamydia trachomatis*. *J Clin Microbiol* 1996;34:2590-2
- 6 Beebe JL, Gershman KA, Kelley JK, Hagner D, Creede P. How adequate is adequate for the collection of endocervical specimens for *Chlamydia trachomatis* testing? *Sex Transm Dis* 1999;26:579-83

(Accepted 28 July 2000)