Secret cervicitis?

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Editorial

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Can Med Assoc J 1998;158:65-7

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Cervicitis means "inflammation of the cervix." This entity should be clearly distinguished from cervical infections caused by specific pathogens such as *Chlamydia trachomatis*, which are not necessarily accompanied by any inflammation. Over the years, there has been considerable debate about the strength of the association between inflammation and infection of the endocervix. Clinicians have dutifully counted polymorphonuclear (PMN) cells on Gram-stained smears of endocervical secretions in an effort to quantify inflammation and thereby recognize a state of infection.

In this issue, Dr. John Sellors and associates (page 41) add to the already-considerable body of literature indicating that there is no definitive cutoff for PMN cell count in determining the presence or absence of infection by *C. trachomatis* and other pathogens at the cervix.[1–8] Although the sample of *Chlamydia*-positive subjects in this study was small enough to leave large confidence intervals around the estimates for some performance characteristics, the study aptly demonstrates that when held under the spotlight of proper evaluation, clinical findings and PMN cell count are unsatisfactory for accurate diagnosis of infection.

Sadly, just because a clinical or test finding is statistically associated with infection does not mean that it will be a useful predictive tool in clinical practice. A sign, symptom or diagnostic test is useful only when its result allows the physician to substantially revise the estimate of the likelihood of disease in a patient — ruling it in or ruling it out. To see if a test meets this criterion, it is helpful to take the perspective of conditional probability and to compare the prevalence of the disease in a population (the pre-test likelihood) with the post-test likelihood of disease given a positive or negative test result. If the post-test likelihood of disease is little different from the prevalence, the test is of no particular value to the clinician. Table 1 summarizes the published literature on diagnostic predictors of cervicitis according to these parameters. A shortfall common to all of the cited studies is the absence of the currently accepted gold standard for diagnosis of *C. trachomatis* — amplified nucleic acid testing.

Several things are evident from the table. First, clinical findings of cervical ectopia or friability are nearly useless in predicting infection. Second, findings of mucopurulent endocervical discharge or 10 or more PMN cells per high-power field on Gram-stained smears are also poorly predictive when assessed individually. Some authors have attempted to improve the accuracy of clinical diagnosis by developing diagnostic scales derived from logistic regression modelling.[2] However, such models are rarely adopted by clinicians, and in any case they are not highly predictive of infection.

So what of the Canadian STD guidelines? The now outdated 1995 update[9] to which Sellors and associates refer acknowledges the problem of interpreting PMN cell count. It does not promote this count or signs of cervicitis as diagnostic criteria for *C. trachomatis* infection per se, although it has indeed used them as guidelines for presumptive treatment. The current update, soon to be in press, removes the PMN cell count from management guidelines for cervicitis. It emphasizes that most cervical infections caused by *C. trachomatis* are *not* accompanied by mucopurulent discharge and directs clinicians to the central role of screening for specific pathogens. This recommendation is crucial because of the poor sensitivity of most presumptive diagnostic modalities for infection at the cervix and the critical role of undiagnosed *C. trachomatis* infection in pelvic inflammatory disease and its sequelae. Clinicians are also reminded that although the PMN count from a Gram-stained cervical smear may be of limited predictive value, a finding of intracellular

gram-negative diplococci can help to rule in the diagnosis of gonorrhea of the cervix.

The new guidelines continue to suggest a role for the presumptive treatment of high-risk clients with mucopurulent endocervical discharge, particularly when follow-up is in doubt. Is such presumptive treatment justified? For high-risk women, the limited predictive capabilities of mucopurulent endocervical discharge and PMN cell counts over 10 per high-power field may yet play a role. The key difference between studies concluding some utility for these criteria[1,3] and those concluding little utility[6] (including the article in this issue) is prevalence. In very high-risk and high-prevalence populations, the weak but positive likelihood ratios associated with these tests are sufficient to push the post-test likelihood of disease to a level (around 50%) where most clinicians would feel justified in administering treatment. Indeed, some might consider an even lower threshold, given that men with non-

Table 1: Purported predictors of cervical *Chlamydia trachomatis* infection and their value to the clinician

Finding	Reference	Prevalence, %	Post-test likelihood, %*		% positive (for finding)†	
			If positive for finding	If negative for finding	If *Chlamdyia* present (sensitivity)	If no *Chlamydia* present (1 – specificity)
Clinical findings in the cervix						
Mucopurulent endocervical discharge	Brunham et al[1]	22	54	12	59	14
	Johnson et al[2]	9	26	8	14	4
	Katz et al[3]	33	52	22	55	25
	Moscicki et al[4]	18	32	15	33	15
	Nher et al[5]	18	25	12	66	44
	Swinker et al[6]	8	24	7	23	7
	Willmott[7]	19	38	10	63	25
Cervical ectopia	Brunham et al[1]	22	28	17	64	48
	Johnson et al[2]	9	14	6	59	37
	Katz et al[3]	33	36	31	36	31
	Moscicki et al[4]	15	47	12	29	6
	Nher et al[5]	18	27	16	28	17
Cervical friability	Brunham et al[1]	22	27	12	82	62
	Johnson et al[2]	9	15	8	28	16
	Katz et al[3]	33	40	29	38	27
	Moscicki et al[4]	13	28	9	39	15
	Nher et al[5]	18	30	14	38	20
Gram stain of endocervical secretion						
≥ 5 PMN/HPF‡	Moscicki et al[4]	18	36	3	91	35
	Nher et al[5]	18	33	12	53	23
≥ 10 PMN/HPF	Brunham et al[1]	23	61	4	90	17
	Katz et al[3]	33	44	20	72	44
	Swinker et al[6]	8	11	5	69	52
	Sellors et al§	6	10	5	41	25
≥ 20 PMN/HPF	Johnson et al[2]	9	13	8	44	31
	Sellors et al§	6	13	5	32	15
Other findings						
Vaginal discharge or dysuria	Nher et al[5]	18	17	19	50	54
Any cervical discharge (not necessarily mucopurulent)	Nher et al[5]	18	20	12	84	73
Leukocyte esterase dipstick positive on cervical secretions	Chacko et al[8]	11	13	7	80	68
Compound diagnostic rules						
≥ 10 PMN/HPF or mucopurulent endocervical discharge	Brunham et al[1]	22	91	3	91	3
	Sellors et al§	6	17	6	11	4
Any cervical discharge (not necessarily mucopurulent) + 1 more cervical finding	Sellors et al§	6	13	5	43	20

*Post-test likelihood is the probability of chlamydial infection given a positive (or negative) result.
†Sensitivity denotes the probability that a finding will be positive among those with chlamydial infection, and 1 – specificity is the probability that a finding will be positive among those without chlamydial infection.
‡PMN/HPF = polymorphonuclear cells per high-power field.
§See page 41.

gonococcal urethritis are routinely treated presumptively even though the likelihood of chlamydial infection in that syndrome is no more than 40% and even though men are at considerably less risk of complications from *C. trachomatis* infection.

In lower-prevalence and lower-risk populations, such as those described by Sellors and others, a decision to treat on the basis of mucopurulent discharge or PMN cell count of endocervical secretions would be far less rational. Now that the incidence of chlamydial infections is declining nationally, truly high-risk clients are seen less often in clinical practice. Specific diagnostic testing for *C. trachomatis* is available to most practitioners and should be deployed with special targeting to women and men under 25 years of age who have had a new sexual partner in the previous 12 months.

In an effort to improve management in countries less well endowed with resources for diagnostic testing, the World Health Organization has distributed management guidelines for syndromic STD.[10] Although there is every reason to expect that these guidelines will work well enough for genital ulcer disease and male urethritis, they are simply not good enough for the diagnosis of cervical infection. The world badly needs an accurate, rapid, inexpensive office test for *C. trachomatis*. Until such a test is widely deployed, presumptive treatment, however imperfect, will remain a component of STD practice.

References

1. Brunham RC, Paavonen J, Stevens CE, Kiviat N, Kuo CC, Critchlow CW, et al. Mucopurulent cervicitis — the ignored counterpart in women of urethritis in men. *N Engl J Med* 1984;311:1-6.
2. Johnson BA, Poses RM, Fortner CA, Meier FA, Dalton HP. Derivation and validation of a clinical diagnostic model for chlamydial cervical infection in university women. *JAMA* 1990;264:3161-5.
3. Katz BP, Caine VA, Jones RB. Diagnosis of mucopurulent cervicitis among women at risk for *Chlamydia trachomatis* infection. *Sex Transm Dis* 1989;16(2):103-6.
4. Moscicki B, Shafer MA, Millstein SG, Irwin CE, Schachter J. The use and limitations of endocervical Gram stains and mucopurulent cervicitis as predictors for *Chlamydia trachomatis* in female adolescents. *Am J Obstet Gynecol* 1987;157(1):65-71.
5. Nher H, Lamminger C, Zimmerman J, Petzoldt D. The value of symptoms and clinical findings in cervical *Chlamydia trachomatis* infection. *Hautarzt* 1991;42(11):687-91.
6. Swinker ML, Young SA, Cleavenger RL, Neely JL, Palmer J. Prevalence of *Chlamydia trachomatis* cervical infection in a college gynecology clinic: relationship to other infections and clinical features. *Sex Transm Dis* 1988;15(3):133-6.
7. Willmott FE. Mucopurulent cervicitis: A clinical entity? *Genitourin Med* 1988;64:169-71.
8. Chacko MR, Kozinetz CA, Hill R, Collins K, Dunne M, Hergenroeder AC. Leukocyte esterase dipstick as a rapid screening test for vaginitis and cervicitis. *J Pediatr Adolesc Gynecol* 1996;9:185-9.
9. Canadian STD guidelines, 1995 update. *Can Commun Dis Rep* 1995; 21S4(suppl).
10. Ryan CA, Homes KK. How should clinical algorithms be used for syndromic management of cervical and vaginal infections? [editorial]. *Clin Infect Dis* 1995;21(6):1456-8.

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