

A CLINICAL PATTERN FOR MAKING AN IMMEDIATE-PRESUMPTIVE DIAGNOSIS OF GONOCOCCAL INFECTION IN WOMEN

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Abstract. *N. gonorrhoea* was found in cultures from 22% of 341 consecutive female patients investigated at the time of their primary visit to the VD clinic. Direct microscopical examination of cervical smears for *N. gonorrhoea* gave an immediate diagnosis in 34% of those infected, but this method presents many difficulties for the doctor and therefore it is of interest to establish other criteria for an immediate-presumptive diagnosis.

The relevance of the following factors was investigated: 1) Symptoms. 2) Suspicion of sexual contact with a *N. gonorrhoea*-infected or possibly-infected person. 3) Number of leucocytes in the smear. Symptoms were not found to be of conclusive relevance, since many patients had symptoms of other etiology than *N. gonorrhoea* and 39% of the women with *N. gonorrhoea* were without symptoms. The clinical pattern which was found to be most relevant for a presumptive diagnosis was the combination of suspicion of gonococcal contact and the presence of polymorphonuclear leucocytes in the methylene-blue stained smear. Positive cultures for *N. gonorrhoea* were found in 27 out of 46 women who fulfilled these criteria. With a combination of direct examination of gonococci in the smear and the criteria mentioned, it should be possible to treat 51% of all cases with *N. gonorrhoea* even on the occasion of their primary visit, though 7% of those who were infection-free would also be treated.

The incidence frequency of gonorrhoea has greatly increased during the last 15 years and now ranks as the most frequently reported communicable disease in the USA (2). The clinical picture of gonorrhoea has changed and it is no longer possible to give a clear-cut description of the clinical manifestations which separate gonorrhoea from other sexually-transmitted diseases. Asymptomatic cases are encountered increasingly frequently, especially in women (10). Not only the specialists, but nearly all doctors are involved in examining suspected cases of gonorrhoea. Problems in giving immediate treatment result from the difficulties encountered making a rapid diagnosis and time is lost in the epidemiological work.

This paper reports a study of the relevance of various clinical criteria for an immediate-presumptive diagnosis of gonorrhoea in women, pending the results of the culture. In order to accomplish this, we compiled clinical factors which might be of importance and correlated them to the results of microbiological cultures for *N. gonorrhoea*. An attempt was then made to construct a clinical pattern which could be used as a basis for making an immediate-presumptive diagnosis of gonococcal infection.

MATERIAL AND METHODS

All women attending the Venereal Diseases Clinic of the University Hospital in Uppsala between February and May, 1972, were included in this study. Excepted were patients who had taken antibiotics during a 2-week period prior to their first visit and patients already treated for gonorrhoeal infection elsewhere who were seen only for follow-up. The final material consisted of 341 women aged between 14 and 40 years (mean 22 years with 84% between 17 and 26 years).

All patients were subjected to a careful and extensive anamnesis. The responses were adapted for computer reading, as were the data obtained by clinical examination and microbiological cultures. Fifty-four per cent of the patients were examined by the author and the remainder by other venereologists working at the clinic.

Specimens were taken with charcoal-coated cotton swabs from the urethra, cervix and rectum. The swabs were then immersed in a protective medium as described in an earlier report (6). Upon arrival at the laboratory, all specimens were cultured on conventional media with and without the addition of a VCN-inhibitor—BBL (Vancomycin, colistemetate, nystatin; Baltimore Biological Laboratories). The plates were incubated at 37°C in 5% CO₂ and 95% humidity and read after 48 hours. The final identification of *N. gonorrhoea* was made with a fluorescent-antibody technique according to Danielsson (5). The conventional medium used had the following composition: gc agar base (BBL) 36.9 g, isovitalex (BBL) 10 ml, hemoglobin (BBL) 20.9 g, and aq. dest. ad 1 000. Plates with the above composition were used parallel with plates containing the VCN-inhibitor (BBL) 10 ml/l, included for suppression of contaminants.

Table I. Percentages of 341 women with and without suspicion of gonococcal infection grouped according to symptoms plus a leucocytic reaction (>10 WBC/HPF) in direct microscopical examination of methylene-blue stained smears from cervix

	Suspicion of infection		No suspicion of infection		Totals
	Leucocytic reaction	No leucocytic reaction	Leucocytic reaction	No leucocytic reaction	
Symptoms	7	16	14	26	63
No symptoms	6	18	1	12	37
Totals	13	34	15	38	100

Smears from the cervix were stained with methylene blue for direct microscopical examination of polymorphonuclear leucocytes and intracellularly-located diplococci with the morphology of *N. gonorrhoea*. If 10 or more polymorphonuclear leucocytes per high-power field (HPF) were seen in several fields when using an $\times 100$ objective and an $\times 12.5$ ocular, the test was recorded as a leucocytic reaction. Fewer than 10 WBC/HPF were recorded as non-reactive.

The patients were classified according to the symptoms mentioned, history of sexual contact with a suspected or proven *N. gonorrhoea*-infected person, and microscopical examination of smears from cervix. The symptoms recorded were vaginal discharge and/or dysuria. No attempts were made to grade these symptoms. Vaginal discharge for more than one year and which was considered normal by the patient was not recorded in this study. All patients were asked about infected or possibly-infected contacts, and a positive answer was noted as "suspicion of *N. gonorrhoea*".

RESULTS

From Table I it can be seen that 63% of the 341 women came to the clinic because of symptoms, 47% suspected themselves to be infected with gonorrhoea and 23% had both symptoms and suspicions.

The results of the microscopical examination for polymorphonuclear leucocytes in the methylene-blue smears are further shown in Table I. The percentage of patients with a gonococcal infection in relation to various combinations of criteria used for a presumptive diagnosis are given in Table II. Only one criterion of either symptoms, or suspicion, or leucocytes established a presumptive diagnosis of gonorrhoea in 21 to 38% of the cases. A gonococcal infection was found in 59% of the women hav-

ing both suspicions and leucocytes and these cases of gonorrhoea represented 36% of all positive *N. gonorrhoea* cultures found. Of all infected patients, 39% lacked subjective symptoms but the clinical examination showed an inflammatory reaction with leucocytes in the smear from the cervix in many of these cases. Asymptomatic gonorrhoea, i.e. absence of subjective or objective symptoms, was found in 14 patients, which represents 19% of all infected women.

The sources of positive *N. gonorrhoea* cultures are shown in Table III. Cervix cultures were positive in 88% of the cases. Positive specimens were obtained from rectum alone in 6%, from urethra alone in 3% and from both urethra and rectum in 3% of the cases.

Table IV demonstrates the significance of direct microscopical examination of methylene-blue smears for the identification of *N. gonorrhoea*, when correlated to the results of the cultures. Positive direct smears in 34% were concomitant with positive cultures. In 3% the cultures showed no growth of *N. gonorrhoea* though the microscopical pictures were positive. No gonococci could be identified in the smears of 63% of the women with positive cultures.

DISCUSSION

The incidence of gonorrhoea has reached epidemic proportions in many parts of the world, and the situation has been described widely as "out of control" (1). Treatment of gonorrhoea is still considered effective if sufficiently high penicillin blood levels are produced (11). The changing clinical pattern of gonorrhoea with asymptomatic cases has made it more difficult to establish the correct diagnosis and

Table II. Percentages of women with positive culture of *N. gonorrhoea* in each group of criteria used for presumptive diagnosis

Criteria used for presumptive diagnosis	No.	Percentage positive <i>N. gonorrhoea</i> culture
Symptoms	215	21
Suspicion	162	36
Leucocytic reaction	97	38
Symptoms + leucocytic reaction	73	30
Symptoms + suspicion	79	39
Suspicion + leucocytic reaction	46	59
Symptoms + suspicion + leucocytic reaction	25	52

to give treatment without losing time waiting for the results of the culture. Treatment on the basis of an epidemiological situation has therefore been tried (4). Fear of changing patterns of resistance, risk of allergic reactions, and the drawback of over-diagnosis and overtreatment with its negative social consequences are some of the arguments against such a method (12).

We have investigated 341 women who visited the clinic consecutively for their primary examination, of whom 22% were found to have positive cultures of *N. gonorrhoea*. The importance of the rectal and urethral cultures from female patients must be emphasized, since 88% of all cases with positive cultures had gonococci in the cervix, but in 6% of all patients the only positive culture was found in the specimen taken from the rectal site.

Symptoms simulating those of gonorrhoea caused 215 women to visit the clinic, though only 21% of them were actually infected with *N. gonorrhoea*. It is therefore not recommended that symptoms alone should be regarded as the criterion for epidemiological treatment of gonorrhoea, and the same applies to patients who are merely suspicious of being infected, since not more than 36% of these women had a positive culture.

Direct microscopical examination of smears stained with methylene blue for the presence of gonococci gave an immediate diagnosis in only 34% of the women having a positive culture. Similar results are reported by Molin (9) and Juhlin et al. (8). In female cases this method is both difficult and time-consuming, yet the results are unsatisfactory. By contrast, the inflammatory reaction with presence of leucocytes is easier to examine and seems to be an acceptable method even for the non-specialist. Microbial and other agents are capable of causing an inflammatory reaction in the cervix. Gonococcal infection was present in only 38% of the women who had a leucocytic reaction. The latter

Table IV. Comparison of gonococcal cultures and results of direct microscopical examination of smears from cervix

Smear	Results of cultures from cervix of 69 women with <i>N. gonorrhoea</i>	
	Positive (%)	Negative (%)
Positive	34	3
Negative	63	0

cannot, therefore, be used alone as a relevant criterion for a presumptive diagnosis.

By various different combinations of the criteria chosen—symptoms, suspicion that partner has a gonococcal infection, leucocytic reaction in the smear—we found that the concomitant presence of suspicion and leucocytes gave an immediate-presumptive diagnosis of gonococcal infection in 46 women. Of these patients, positive cultures were found in 27 (59%). By giving this group immediate treatment, 36% of all women with gonorrhoea would be treated but 7% (19 of 265) of those without gonorrhoea would be treated unnecessarily, which might be acceptable in certain epidemiological situations. Direct microscopical examination of cervical smear showed gonococci in 14 of the 27 cases with suspicion plus leucocytes, but a positive smear was also found in 12 other patients not having these criteria. This means that a combination of direct examination of gonococci in the smear and the criteria mentioned would make it possible to treat 51% of all 76 infected women even on the occasion of their primary visit.

Asymptomatic infection is the stage in which there are no clinical signs or symptoms of the disease detectable by either the patient or the examining physician (10). By using the presence of leucocytes in the smear as a clinical symptom of gonococcal infection, we found 19% of the women to be asymptomatic. More important, however, is the fact that there were 39% with a gonococcal infection yet suffered no subjective effects from the disease. These patients probably constitute a greater potential source for the spread of gonorrhoea than their symptomatic counterparts. This group also contributes to many of the complicated cases of gonorrhoea (3, 7). By using both suspicion plus presence of leucocytes as diagnostic criteria of a gonococcal infection, but exclude symptoms, one may reduce

Table III. Sources of positive culture for *N. gonorrhoea* cultured from 76 women

Location	Per cent
Cervix	88
Urethra alone	3
Rectum alone	6
Urethra + rectum	3

the size of this important group of patients who do not recognize any symptoms.

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