UROGENITAL GONOCOCCAL INFECTION
IN YOUNG GIRLS*

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Since the introduction of antibiotics, the incidence of gonorrhoea in adult women has diminished, and the disease is less serious. In young girls with vulvo-vaginitis the infection is rarely due to the gonococcus in France. This is doubtless associated with diminished incidence of gonorrhoea but is also due to a better understanding of the pathology of vulvo-vaginitis in children. In the past, many cases were labelled gonococcal without evidence of the presence of the gonococcus. It was customary to speak of chronic infections, relapses, and recrudescence at puberty; but now we know that these were infections of non-specific origin or even merely physiological secretions, the frequency of which in those days was underestimated.

All the same, except among specialists, the frequency of a gonococcal aetiology is often exaggerated, so that we feel it desirable to publish our observations over the past 10 years of pathological conditions of the genitalia in young children.

Clinical Material
A great majority of the children examined came from the medical out-patient departments of l'Hôpital Bretonneau (and we are greatly obliged to Professors Morin and Musset, and Doctors Salet and Bouchard for sending us their young patients). In short, they were a fair paediatric sample drawn from a populous district of Paris. All girls with any sort of genital trouble were sent to our special department. A small minority of the children came from other hospitals in and around Paris, and a few were seen as private patients.

The number of children with leucorrhoea of different sorts examined since 1956 was 872; all were under 15 years of age, and the majority of gonococcal infections were found in girls between 2 and 5 years old.

Examination
In every case this included a complete endovaginal exploration, which was invariably carried out with the mother present and in circumstances which would have no adverse psychological effect upon the child. No difficulty was experienced except with the very young.

(a) The gynaecological position was always used, for it is easier and more practical than the genugpectoral position which few seem to prefer. No local or general anaesthetic was needed.

(b) The instruments used included small specula† of different calibres, derived from an aural speculum to which is attached a tube several centimetres in length, special forceps,† snares, and a spatula for taking specimens. The use of these fine instruments allows a complete examination to be made without the slightest damage to the hymen.

(c) The actual examination is made in three stages:

(i) Examination of the Vulva All the folds of the mucosa are carefully explored by drawing them gently outwards and backwards. The prepuce of the clitoris and the labia minora are likewise drawn outwards and upwards, revealing the orifice of the hymen. The speculum is then introduced.

(ii) Examination of the Vagina and Cervix This requires some practice. The cervix is sometimes difficult to see, for it is not always situated centrally. While withdrawing the speculum, lateral movements are necessary in order to explore the entire cavity, the mucous membrane immediately closing over the open end of the speculum.

* Paper read to the M.S.S.V.D. on May 20, 1966. Received for publication July 18, 1966.
† Speculum de Plantureux and pinces de Sersiron—Pouret, Paris.
(iii) Rectal Examination  This is always carried out to eliminate possible organic abnormality and to gauge the size of the uterus. This excludes the rare possibility of the presence of a tumour of the abdomen or uterine adnexae.

(d) These examinations allow a clinical classification of various forms of leucorrhoea to be made:

(i) Vulvo-vaginitis
   
   **ACUTE CASES**  Pain on micturition, and sometimes abdominal pains, bring the condition to the notice of relatives; and also staining of underclothing. The cutaneous area of the vulva is erythematous and may be excoriated. The mucous membrane of the vulva is very red and sometimes oedematous, and the vestibule is covered with copious purulent discharge. After careful swabbing, the hymen and urinary meatus are seen to be equally erythematous. There is often some difficulty in making the examination, for the parts are much inflamed and tender. The vaginal mucosa and the cervix are also covered with purulent secretion.

   **CHRONIC OR SUBACUTE CASES**  The clinical signs may be minimal, although between this and the very acute condition varying degrees of inflammatory reaction can be seen. The absence of at least slight discomfort on micturition is very rare, but the vulva presents a normal appearance except for a few localized red patches, and there is little or no discharge. The vagina and cervix also seem normal but there is enough secretion to allow a specimen to be taken, and this indicates that there is some inflammation.

(ii) Simple Vulvitis
   
   In many cases the vagina shows no clinical or bacteriological signs of infection: there is nothing more than inflammation of the vulva. Such cases are chronic or subacute, for where the vulvitis is acute the vagina is practically always involved as well.

(iii) Superficial Ulcerations of the Cervix
   
   These are identical with those found in adults, and the mucosa round the external surface of the os is sometimes severely inflamed.

(iv) Vulvo-vaginal Organic Abnormalities
   
   Occasionally one sees a small polypus of the vulva, the hymen, or the cervix in little girls. Cysts of the vagina or vestibule are also observed, and sometimes venereal warts.

(v) Foreign Bodies in the Vagina
   
   These frequently give rise to infection, usually acute, and often to bleeding; they may be discovered by chance in the course of a full gynaecological examination.

(vi) Physiological Leucorrhoea
   
   Not all discharges in girls are infective; as soon as the ovary begins to secrete oestrogens a more or less abundant leucorrhoea may appear. It consists of cervical mucus, vaginal transudate, and cellular debris. The reaction is acid, and almost immediately Döderlein’s bacillus establishes itself. There is no inflammation of vagina or vulva, though there may be cutaneous irritation associated with lack of hygiene. Discharges of this kind are not pathological but must be mentioned as we see many children with this condition, which suggests the presence of infection.

(e) In all cases specimens of secretion, collected with a fine metal spatula, were examined after staining by Gram’s method. Cultures were made in the laboratory of one of us (V.R.) in a series of 116 consecutive cases, and also in sixteen cases in which direct examination of the slide did not furnish a bacteriological diagnosis. Some of the cultures and most of the slides were made in the laboratory of l’Hôpital Bretonneau and a few in private laboratories.

   Secretion from the posterior fornix was collected on two cotton-wool charcoal-coated swabs, and transferred to the laboratory.

(f) Bacteriology  As soon as the specimens were received, the following inoculations were made:

   (i) On our medium for the culture of the gonococcus;
   
   (ii) On nutrient agar;
   
   (iii) On Pagano’s medium for the culture of yeasts;
   
   (iv) In our liquid medium for the culture of *Trichomonas vaginalis*.

   The growths thus obtained were then subcultured on appropriate media for identification (the colonies of the *Neisseria* group on fermentation plates of glucose and maltose).

**Results**

(a) Statistical Results

In order to show the precise part played by the gonococcus in pathological conditions affecting the genitalia in young girls, we thought it would make for clarity to show together the detailed results of our investigations. With this object, we have classified the results both clinically and bacteriologically (Table I, opposite).

All the gonoccci and all the non-gonococcal *Neisserian micro-organisms* were definitely identified from cultures on specific media. One of us (V.R.)
identified all the nine non-gonococcal Neisseriae. Four of the 21 isolates of gonococci were identified in other hospital or private laboratories, invariably by the use of fermentation plates.

Trichomonas vaginalis was identified in all cases in fresh specimens, with the exception of four that were diagnosed by culture.

The fungal infections were identified (or confirmed) eleven times by culture and 23 times directly on the slide.

During part of our investigation microscopic and cultural tests were carried out on a series of 166 consecutive cases of leucorrhoea in young girls seen at the out-patient department of l'Hôpital Bretonneau (Table II). In addition to this series the diagnosis was made on slides, and cultures were used only where there was the slightest doubt.

These figures show the diversity and incidence of the micro-organisms found in a consecutive series of patients.

(b) Age Distribution of Gonococcal and Non-Gonococcal Neisserian Infections

Table III shows that gonococcal infection in young girls occurs predominantly between the second and the fifth years of life. Although the numbers may be too small to be statistically significant, the impression which they convey may be correct; one may be justified in thinking that in the first year of life the child is more carefully looked after and is better protected from possible sources of infection. In the non-gonococcal Neisserian cases there is no detectable relationship with age group.

### Table I

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Döderlein</th>
<th>Mixed Flora</th>
<th>Gonococcus</th>
<th>Neisseria non-gonococcal</th>
<th>Trichomonas vaginalis</th>
<th>Mycoses</th>
<th>Total</th>
<th>Percentage</th>
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<tr>
<td>Physiological Leucorrhoea (non-inflammatory)</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>14.91</td>
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<tr>
<td>Simple Vulvitis—Acute</td>
<td>18</td>
<td>169</td>
<td>2</td>
<td>6</td>
<td>18</td>
<td>24</td>
<td>133</td>
<td>48.02</td>
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<tr>
<td>—Subacute or chronic</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>169</td>
<td>21.39</td>
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<tr>
<td>Vulvo-vaginitis—Acute</td>
<td>84</td>
<td>252</td>
<td>21</td>
<td>0</td>
<td>2</td>
<td>18</td>
<td>10</td>
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<td></td>
<td></td>
<td>252</td>
<td>21.39</td>
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<tr>
<td>Benign Ulceration of the Cervix</td>
<td>51</td>
<td>44</td>
<td></td>
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<tr>
<td>—Acute</td>
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<td></td>
<td>51</td>
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<td>9.10</td>
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<td>Vulvo-vaginal Organic Abnormality—Chronic</td>
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<td>18</td>
<td>2.60</td>
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<td>Foreign Body in the Vagina</td>
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<td>19</td>
<td>2.72</td>
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<tr>
<td>—Acute symptoms</td>
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<td></td>
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<tr>
<td>—Subacute or chronic symptoms</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
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<tr>
<td>Total</td>
<td>130</td>
<td>658</td>
<td>21</td>
<td>9</td>
<td>20</td>
<td>34</td>
<td>872</td>
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<tr>
<td>Percentage</td>
<td>14.91</td>
<td>75.40</td>
<td>2.40</td>
<td>1.15</td>
<td>2.28</td>
<td>3.86</td>
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### Table II

<table>
<thead>
<tr>
<th>Organism</th>
<th>No.</th>
<th>Per cent.</th>
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<tbody>
<tr>
<td>Neisseria gonorrhoeae</td>
<td>11</td>
<td>6.6</td>
</tr>
<tr>
<td>Neisseria (other)</td>
<td>7</td>
<td>4.2</td>
</tr>
<tr>
<td>Pathogenic staphylococci</td>
<td>16</td>
<td>9.6</td>
</tr>
<tr>
<td>Non-pathogenic staphylococci</td>
<td>20</td>
<td>12.0</td>
</tr>
<tr>
<td>Streptococci</td>
<td>7</td>
<td>4.2</td>
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<tr>
<td>Enterococcus</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>E.coli and coliform organisms</td>
<td>23</td>
<td>13.8</td>
</tr>
<tr>
<td>Proteus</td>
<td>23</td>
<td>13.8</td>
</tr>
<tr>
<td>Candida albicans</td>
<td>6</td>
<td>3.6</td>
</tr>
<tr>
<td>Trichomonas vaginalis</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>No identifiable organism isolated</td>
<td>50</td>
<td>—</td>
</tr>
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### Table III

<table>
<thead>
<tr>
<th>Age</th>
<th>Gonococci</th>
<th>Non-gonococcal Neisseria</th>
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</thead>
<tbody>
<tr>
<td>1st year</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2nd year</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>3rd year</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4th year</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5th year</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6th year</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7th year</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8th year</td>
<td>1</td>
<td>3</td>
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<tr>
<td>9th year</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>10th year</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>11th year</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>12th year</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>9</td>
</tr>
</tbody>
</table>
It should be pointed out that in no case was *Trichomonas vaginalis* discovered in a child before the menarche (average age of twenty girls in whom *Trichomonas* was present 13 years 8 months).

On the other hand moniliasis was seen to occur at any age in childhood (average age of 34 girls 8 years 6 months).

Ulceration of the cervix was never seen before the onset of puberty was definite.

Evidently, functional leucorrhoea never develops before the establishment of oestrogenic function, of which this leucorrhoea is a physiological manifestation.

(c) Results of Tracing the Source of Infection

Attempts to do this are often misleading and fraught with difficulty. In four cases one of the parents had a gonococcal infection, in one an elder brother, and in one an elder sister. In the other cases, in spite of the efforts of social workers, it was impossible to find the source of infection.

Although (anonymous) notification is in force, it is very often found in practice that to take all the steps indicated would be impossible without the risk of doing the child damage socially and of bringing the police into what is already a sad enough story.

Discussion

(a) Gonococcal vulvo-vaginitis in young girls is far from common

In spite of what many paediatric and gynaecological textbooks still say, some other micro-organism is far more frequently responsible. The incidence of gonococcal infections in our series is less than 2.5 per cent, and the number of cases involved makes this percentage significant.

Most modern authors who have studied the subject have figures much the same as ours.

(b) Gonococcal vulvo-vaginitis in young girls has always been in our experience in the acute stage

There is always obvious purulent discharge with marked symptoms of a local burning sensation and discomfort on urinating. It is worth noting that it is the children themselves who nearly always draw attention to their complaint: even when very young they complain bitterly of distress or pain. On the other hand, those with ordinary vulvo-vaginitis suffer far less, and sometimes there is no more than maternal anxiety over stains on the daughter’s underclothing (associated with subacute or chronic vulvo-vaginitis). We do not intend to imply that all acute cases of vulvo-vaginitis are gonococcal, but the 21 which we encountered had copious discharge all over the vulva and every sign of an acute inflammatory condition.

In contrast, all the chronic cases of vulvo-vaginitis with relatively few symptoms were attributable to various causes, but never correctly to the gonococcus, although sometimes routine laboratory examinations had been reported as positive.

We saw no local or distal complications of any kind: and every author on the subject agrees that these are in fact very rare (gonococcal ophthalmia neonatorum in France has disappeared).

In almost all our cases a test of cure was carried out 7 days after completion of treatment. It has not always been possible to persuade the relatives to bring the child for a second test a month later, but no child has ever returned as a case of relapse. So-called relapses were so frequently reported in the past that we think it necessary to repeat that we have never seen one.

(c) The mode of infection of the children was by no means always sexual

Nevertheless in two instances attempted rape appeared to be responsible (in one girl aged 10 and in another aged 12) and legal proceedings followed. But it is exceedingly difficult in such cases to know exactly what happened and to appreciate the conditions in which the child lived. It seems that, in the majority of cases, it is neglect and lack of hygiene that is the cause rather than actual venereal contact. The average age of the children concerned (41 years) also favours lack of personal hygiene as the cause.

Much depends on the family background, which is often unusual in these cases. Either there is lack of discipline, or the child is in charge of a foster mother. Almost always she is badly dressed and sometimes looks miserable. One may say that, in arriving at a diagnosis of gonococcal infection in a young girl, the sociological context should be taken into account.

(d) Differential diagnosis between gonococcal and non-gonococcal Neisserian infection is important

The incidence of the two conditions is comparable although there are differences in the clinical picture. It is now well known that non-gonococcal Neisserian infections occur in women, but it is less generally recognized that they may also be found in young girls. They have certainly been responsible for past mistakes and still present difficulties in differential diagnosis.
We have recently seen several instances of children wrongly treated—without specialist advice—for so-called gonorrhoea (either a first attack or a relapse) when in fact the infection was due to non-gonococcal Neisseriae. In some cases the diagnostic error had dramatic consequences (involving conjugal upset, expulsion from school, inquiries, etc.) which should never have occurred.

These non-gonococcal Neisserian infections are not pathogenic, the organisms being nearly always associated with common mixed flora. Childhood infections of the naso-pharynx or intestines or some viral attack may evoke these leucorrhoeas, accompanied by an inflammation usually subacute or chronic but occasionally acute. The most carefully tended little girls can, of course, be infected, and one must avoid allowing relatives to think that the condition is associated with the gonococcus—the only relationship being one of nomenclature.

The actual frequency is difficult to determine, for we have not been able—nor have we wished—to undertake among young girls the systematic search for these saprophytic Neisseriae that is possible among adult women (Roiron, 1957).

However, our results in this series of 166 patients entitles us to believe that, if bacteriological investigations could have been carried out on all our 872 children, it would have been possible to find larger numbers of non-gonococcal Neisseriae. We should have been justified in saying that their incidence was more than half of the gonococcal cases if we confined our studies to the common subacute or chronic leucorrhoeas. It was in four cases of this type that an erroneous diagnosis of gonorrhoea was corrected to that of a non-pathogenic Neisserian infection; and it would probably have been possible to find many more among the many cases of benign leucorrhoea subjected only to the ordinary microscopic and cultural examination. In any event confirmation of these views is to be found in our consecutive series of young patients, among whom there were seven non-gonococcal Neisserian infections compared with eleven gonococcal—a ratio of 63 per cent.

These comments on differential diagnosis stress the importance of laboratory investigations, but these themselves may be deceptive if the specimens have been taken carelessly or if identification has been incorrectly carried out. Some laboratories are at fault in this respect, particularly when the precise nature of the required examination has not been explained.

Treatment

One can hardly discuss gonococcal vaginitis without making some reference to treatment. There are no difficulties which are not common knowledge, but it is useful in treating pre-pubertal girls to associate with the antibiotic some hormonal therapy.

Antibiotic Treatment

During the last 10 years we first used streptomycin in a dosage appropriate to age (0.50 to 0.75g. daily for 3 days). Then, when resistance to that antibiotic was found in two of our 21 cases, terramycin was given by mouth; with small children it is not necessary to give this antibiotic parenterally, for there is no difficulty in ensuring that the oral doses are taken.

Hormonal Treatment

The cautious administration of an oestrogen is not imperative, but it has the great merit of rendering the vagina acid, and thereby affording protection against re-infection (by specific or mixed organisms) for some weeks after the child returns to her normal environment. It is thus a worthwhile adjuvant to antibiotic therapy. Ethinyloestradiol, given sublingually, is easy to administer, is exact in dosage, and gives excellent results. One linguette of 10μg. should be given every second or third day to a total of three to five linguette (i.e. 30 to 50 μg.). This dosage is adequate and never proves to be excessive.

Vaginitis with non-gonococcal Neisseriae is readily cured by locally applied and systemic oestrogen therapy. We had only one resistant case, which was cured at the second attempt after testing for susceptibility to various antibiotics.

Summary

Among 872 children with leucorrhoea, we found 21 cases of gonococcal vulvo-vaginitis, but many more associated with other pathogenic agents.

A full gynaecological examination enabled us to classify leucorrhoea clinically and bacteriologically into cases of simple vulvitis, vulvo-vaginitis, benign ulceration of the cervix, organic vulvo-vaginal abnormalities, foreign bodies in the vagina, and physiological non-pathogenic leucorrhoea. Bacteriological specimens were taken for culture on various media and for subsequent subculture on specific media to ensure correct diagnosis.

The gonococcus was found in only 2·4 per cent. of cases; non-gonococcal Neisseriae in 1·15 per cent.; various organisms in 75·40 per cent.; Trichomonas vaginalis in 2·28 per cent.; and fungi in 3·86 per...
cent. The maximum incidence of gonococcal infections occurred in the second to the fifth year of life. Infection responsible for leucorrhoea was most often associated with lack of hygiene, but a sexual source was sometimes found.

Compared with other types of leucorrhoea, gonococcal infection in young girls is rare, and is always acute with a purulent discharge.

Non-gonococcal Neisseriaceae may be found in young girls, and their incidence is not negligible though less than that of gonococcal infections. Diagnosis should be based on unassailable bacteriological evidence, for a mistake can have social consequences unfair to the child and to those around her.

REFERENCE

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La gonococcie génitale chez la petite fille

RÉSUMÉ

Parmi 872 enfants atteints de leucorrhée, nous avons découvert 21 cas de vulvo-vaginites gonococciques, mais aussi beaucoup de leucorrhées relevant d’un autre agent pathogène.

Un examen gynécologique complet nous a permis de classer ces leucorrhées en vulvites simples, vulvo-vaginites, exulcérations bénignes du col, anomalies organiques vulvo-vaginales, corps étrangers du vagin, et leucorrhées fonctionnelles non pathologiques. Du point de vue bactériologique les prélèvements ont été faits pour permettre des cultures sur des milieux divers et des repiquages sur des milieux d’identification plus spécifiques afin d’obtenir un diagnostic rigoureux.

Le gonocoque n’a été trouvé que dans 2,4% des cas, les Neisseria non gonococciques dans 1,15%, des germes divers dans 75,40%, le Trichomonas vaginalis dans 2,28%, et des mycoses dans 3,86%.

L’âge des enfants atteints de gonococcies s’est trouvé maximum entre 2 et 5 ans. La contamination semble plus souvent liée au manque d’hygiène, mais des contacts vénériens semblent parfois certains.

La vulvo-vaginite gonococcique est donc maintenant une éventualité rare. Les gonococcies observées a toujours été d’allure aiguë suppurée.

Le nombre appréciable de Neisseriases non gono-
cocciques montre que le diagnostic différentiel doit être sérieusement discuté avant tout diagnostic positif de vulvo-vaginite gonococcique. Les techniques de laboratoire doivent être très strictement prescrites et effectuées car des erreurs peuvent survenir.