PROGRESS IN PEDIATRICS

LITERATURE OF 1913 AND 1914 OF INFECTIONS OF THE GENITO-URINARY TRACT IN CHILDREN

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VULVOVAGINITIS

Sources of Infection

Taussig,¹ in a report of sixty-six cases of vulvovaginitis treated in the Washington University Gynecological Dispensary, writes that "a correct appreciation of the etiological factors can only be obtained by considering the anatomy and histology of the lower genital tract in girls before puberty." The epithelium is not only much more delicate than in the adult, but is also far more open to infection, owing to the small size of the labia majora and the absence of hair. "In analyzing the possible causes of this infection we must consider first the source, and second, the manner of transmission." "The first question is whether the parents are the source of infection." In only two cases did the mother have a discharge, and further, only two patients were under 1 year of age, at which time they are most exposed to infection by the mother. He considers that "other already infected girls of the same age" are "the most important factor in the spread of the disease."

Under manner of transmission he considers rape, which is rare; the hand of an infected mother or other person, which is not common, and finally clothing, which is unlikely because of the inability of the gonococcus to withstand drying. "Being primarily concerned with home cases" he leaves out the common bath-tub as a means of spreading the disease, but does lay great stress on the danger of infection from the ordinary water closet seats which are built "so high that the smaller children in using them are forced to have their genitals and clothing rub over a considerable portion of the seat." The greatest danger is in the tenement houses and public schools. Taussig does not give "figures regarding etiology from the social service investigation of the cases, because the evidence on which they were based varied so much in reliability." However, "forty-seven out of sixty-six girls were of school age or over."

1. Taussig, F. J.: Am. Jour. Med. Sc., 1914, cxlviii, 480.

R. M. Smith² has studied the sources of infection through home visits by a social worker, and gives the following table based on thirty cases:

Undetermined	5 cases = 16.6 per cent.
Hospital infection	1 case = 3.3 per cent.
Playmates	4 cases = 13.3 per cent.
Assault	4 cases = 13.3 per cent.
Other members of family infected...	16 cases = 53.3 per cent.

Over half the cases were apparently due to infection from other members of the family, in which Smith's findings disagree with Taussig's opinion, though the two agree that hospital and institutional cases are a minority. Smith says, however:

Bad habits are taught young children by those older than themselves, in some instances by those old enough to understand fully the significance of sexual matters. Masturbation is extremely common among the infected cases. Whether as a result of this or not . . . many of these children are sexually precocious. . . . I am confident that as we learn more intimately the history of infected children the less often we shall have to attribute the infection to toilets or other indefinite sources.

The same author also emphasizes the great influence of feeble-mindedness both in the children and in adults, finding that "in five of our [thirty] patients the infection is directly traceable to feeble-minded individuals, and two other patients were themselves feeble-minded."

Barnett³ has analyzed fifty cases from the Mount Sinai Hospital in New York, and gives the following figures:

Discharged from hospital or other institution.....	36 per cent.
Sleeping with mother who has a vaginal discharge..	18 per cent.
Sleeping with sister who has a vaginal discharge..	10 per cent.
Cases of unknown origin.....	36 per cent.

Spaulding,⁴ reporting eighty-three cases from the special clinic at the Children's Hospital in Boston, gives a somewhat similar list:

Discharged from hospital.....	21 per cent.
History of discharge in parent.....	35 per cent.
History of contact	4 per cent.
Not discovered	40 per cent.

Sinclair⁵ examined eighty-three babies at the Babies Hospital of Philadelphia and found that 19 per cent. were infected or highly suspicious on admission, and that 8.4 per cent. developed the disease in the hospital or the convalescent home.

On the whole, the recent trend, notwithstanding the great importance of hospital and institutional epidemics, would seem to place the

2. Smith, R. M.: Vulvovaginitis in Children, *AM. JOUR. DIS. CHILD.*, November, 1913, p. 355.

3. Barnett, N.: *Arch. Pediat.*, 1913, xxx, 650.

4. Spaulding, Edith Rogers: Vulvovaginitis in Children, *AM. JOUR. DIS. CHILD.*, March, 1913, p. 248.

5. Sinclair, J. F.: *Arch. Pediat.*, 1914, xxxi, 29.

ultimate responsibility further back, in the home, the school and the street or playground.

We must recognize that we are dealing not only with a medical disease but also with a social evil, and that the medical treatment alone is only a part of what needs to be done. This means that we must establish a close cooperation with the social workers in their attempt to solve the delicate questions of venereal disease.⁵

Prophylaxis

The medical profession is just beginning to realize the great number of endemic cases in the cities and the difficult nature of the problem. The health commissioner of New York, Dr. Goldwater, has recently made a preliminary report on the question, of which the following is an extract.⁶

That a form of vaginitis which is bacteriologically indistinguishable from gonorrheal vaginitis is a common condition among children in this city and elsewhere, is well known to clinicians.

If a serious attempt were made to exclude from school all children who suffer from vaginitis, it would be necessary (a) to establish the machinery by which a complete physical examination of all female school children could be made; (b) to convince the public of the necessity of the proposed measure; (c) to establish the legal and moral right of the city authorities to require such an examination. Furthermore, inasmuch as the condition in question is one which, notwithstanding the most intensive treatment, often persists for months and even for years, it would be necessary to inaugurate a method by which the education of excluded children could be continued. The only logical method would be to send private teachers into the houses of infected children.

The questions here involved are among the most difficult and puzzling with which public health administrators have to deal. I am not aware that the problem has been solved anywhere, and can only promise, on behalf of this department, unremitting attention to it, in the hope that a working program may ultimately be formulated.

Taussig¹ writes that "Gonorrhea in little girls . . . is simply the result of inadequate sanitary precautions," and offers the following suggestions "as additional preventive measures for the control of this disease":

1. The instillation of a drop of 2 per cent. silver nitrate solution in the vestibulum vaginae of all new born girls whose mothers show evidence of gonorrhea.

2. Making vaginitis in children a disease reportable to the Board of Health. . . . We would not be justified in excluding the children from school for eight or nine months . . . , unless there existed a special school . . . where [they] could be given . . . instruction.

3. Instruction of parents of infected children through the visiting nurse regarding preventive measures to limit the infection.

4. Investigation by the visiting nurse as to the probable origin of the infection in each case with a view to excluding this factor from contaminating other children in the same house.

5. The adoption of a U-shaped seat with low bowl and other precautionary measures to prevent the spread of infection through the public lavatories in schools, playgrounds, comfort stations and tenements. I consider this last named suggestion the most important of all. . . .

6. Goldwater, S. S.: *Modern Hospital*, 1914, ii, 305.

Taussig also as well as Barnett³ advises the use of paper coverings for lavatory seats.

These are the most radical recommendations yet made. Most authors^{4, 2} content themselves with keeping the children out of school for a week or two, and warning the teachers and school nurses when they go back that they are not to use the toilet. G. G. Smith⁷ adds that with "this danger removed [i. e., the common toilet] they are less likely to be a focus of infection while in school than when playing untended on the street."

Diagnosis

Sinclair⁵ examined eighty-three girls under 3 years of age consecutively admitted to the Babies Hospital of Philadelphia, and reports that scraping the vagina with a platinum loop was the most efficient method of obtaining a positive smear. Rinsing of the vaginal vault with a 1:5,000 mercuric chlorid solution and examination of the centrifugalized sediment of the collected fluid was not satisfactory. Of the positive or suspicious cases 21.7 per cent. would have escaped detection without examination with the urethroscope.

Barnett³ uses a speculum and mirror to aid him in getting scrapings of the vagina with a platinum loop.

Treatment

The general opinion seems to be that children with vaginitis do better if they are kept in bed or very quiet during the first few weeks and then if particular attention is paid to improving their general condition. Further than this there is the greatest possible disagreement as to treatment. Kerley,⁸ as an example of one type of procedure, uses nothing but a cleansing douche of warm boric solution four times a day followed by a thorough drying and dusting with boric acid starch and zinc. He believes "that gonorrheal vaginitis is a self-limited disease, and that something takes place during the child's life that makes the vagina less hospitable to the gonococcus." Hamilton⁹ also, as far as the local treatment goes, does nothing but "keep the patient clean and dry."

Barnett³ uses a daily permanganate douche given at home by the mother or a visiting nurse, and follows it three times a week by an endoscopic treatment of the cervix and vagina with Lugel's solution. He also gives hexamethylenamin. He concludes that

7. Smith, George Gilbert: The Treatment of Gonococcus Vulvovaginitis, with Further Observations on the Value of the Complement Fixation Test in the Management of this Disease, *AM. JOUR. DIS. CHILD.*, March, 1914, p. 230.

8. Kerley, C. G.: *Arch. Pediat.*, 1913, xxx, 702.

9. Hamilton, A.: *Arch. Pediat.*, 1913, xxx, 702.

The first important fact to bear in mind in treating this disease is the infection of the cervix and the difficulty of reaching this nidus of infection by the ordinary methods of treatment. Any infection of the cervix is difficult to treat because of its inaccessibility to the child. The simplest method . . . , irrigation of the vagina, is neither practical nor of great value. The affected parts are not reached directly, and the treatment must be continued for too long a time Direct applications must be made to the deep point of infection. Cures can be obtained by the treatment of the cervix . . . in a short period of time, and strong solutions can be applied to the cervix and vaginal walls directly without causing any pain.

Spaulding,⁴ G. G. Smith,⁷ and R. M. Smith² all favor a daily cleansing douche followed by the instillation of some silver preparation. G. G. Smith⁷ adds that after the injection the child should lie on her back for at least fifteen minutes with her hips elevated and thighs pressed together. He also, in persistent cases, makes direct applications to the cervix through an endoscope, using either tincture of iodine or a silver solution. Taussig¹ omits the douche, but uses locally 25 per cent. argyrol or a solution of silver nitrate, from 2 to 4 per cent.

Rubin and Leopold¹⁰ are the strongest exponents of the necessity of endoscopic treatment. They have made a careful study of fifty cases "under extended observation and under various treatments, including . . . all known therapeutic remedies." They made use in every case of the electric lighted female urethroscope and "have shown that the infection involves the vagina and the vaginal portion of the cervix." They suggest that:

1. It is important to determine the extent of the deep lesion before any active treatment is begun. For this purpose the electric lighted female urethroscope should be used.

2. By means of the same instrument appropriate medication can be carried out.

3. When irrigations are resorted to the douche tip or catheter should enter the vagina at least 1½ inches.

4. Applications by means of swabs used alone are useless and injurious.

5. When strong silver solutions are applied to the cervix and vagina it is well to keep the patient in bed for a few days.

Mattisohn,¹¹ however, considers that "cervix involvement is not proven."

There is also considerable disagreement about the use of vaccines. Hamilton⁹ says she is "still enthusiastic in the treatment of recent cases by vaccines." Comby and Condat¹² give the case reports of sixteen girls with gonorrheal vulvovaginitis and one boy with urethritis, all treated with Nicolle's vaccine, which is a mixture of one part gonococci to nine parts of a similar symbiotic Gram-positive coccus. "The hos-

10. Rubin, I. C., and Leopold, J. S.: On the Cause of the Persistence of Gonorrheal Vulvovaginitis in Children, *AM. JOUR. DIS. CHILD.*, January, 1913, p. 58.

11. Mattisohn: *Arch. f. Dermat. u. Syph.*, 1913, cxvi, 817.

12. Comby, J., and Condat: *Arch. de méd. d. inf.*, 1914, xvii, 419.

pital patients remained in bed," but "all local treatment was omitted." "Improvement is in general rapid. After the second injection, sometimes after the first, the diminution in the discharge is very clear; progress thereafter is slower and less regular, and seven injections at least are necessary to obtain a satisfactory result." In recent cases the authors obtained an apparent cure, "but the results in older girls were uncertain." "This method . . . allows the omission of douches, so badly tolerated . . . and so often impossible to entrust to the mother." "In certain more tenacious forms the two treatments can . . . be combined; but, in recent cases, vaccine therapy would seem sufficient."

Spaulding⁴ has tried out vaccines in thirty-five cases, in addition to the local treatment. Autogenous preparations she found no better than stock. She concludes that "in our hands vaccine has not proved a specific . . . However, we do feel that it is an additional factor for good . . ."

Barnett,³ on the other hand, treated fourteen of his fifty cases "with vaccines at intervals of three to seven days in doses of from 5 to 100 millions," and reports that "none of my cases treated with vaccines showed any improvement as to the vaginal discharge."

Heyman and Moos¹³ have reached a similar opinion, saying "in open lesions of urethral and uterine mucous membranes it has failed entirely."

Hamburger¹⁴ reports on twenty-one cases in all of which the patients were kept in bed without local treatment during the administration of vaccines. "Five children were given three to four intravenous injections. To this method . . . we must take exception because of the severe . . . reaction. All other injections were intramuscular . . ." He concludes that "The treatment of vulvovaginitis by vaccines alone is absolutely and entirely insufficient to replace local treatment."

Reinfection or Relapse

Spaulding⁴ is frankly pessimistic in her belief as to the great frequency of relapse. Of twenty-six cases "all but two had a recurrence of the discharge after intervals varying from three weeks to six months, and one of these two had a vulvovaginal abscess after the discharge had ceased, strongly suggesting that the infection was still present." "We believe . . . that the disease may extend over many years, during which time there may be many recurrences, and that the periods

13. Heyman, H., and Moos: *Monatschr. f. Geburtsch.*, 1913, xxxvii, 632.

14. Hamburger, R.: *Deutsch. med. Wchnschr.*, 1914, xl, 759.

of latency may be as long as eighteen months," and "that the most efficient treatment does not insure a permanent cure."

Mattisohn¹¹ says that "the prognosis [is] . . . rather favorable for a final cure, [but that] proper treatment takes at least four to six months, often much longer, a permanent cure can be spoken of only if after months or years no gonococci are recognizable."

Barnett's³ definition of cure is three negative vaginal smears one week apart.

G. G. Smith,¹⁵ in his first paper, writes:

A study of twenty-five cases of vulvovaginitis by means of the complement fixation test shows that the test was positive in eleven out of twelve clinically positive cases, and in four cases in which the evidence was inconclusive. It was negative in three cases in which other evidence of cure was insufficient, but in seven others the clinical findings were corroborative. We are of the opinion that for the purpose of establishing a cure, the test is of considerable value.

A year later, the same author⁷ strongly opposes Spaulding's views of the frequency of relapses, arguing that in her cases "the test of cure was insufficient." He writes that "if after three or more months, during which frequent smears from the depths of the vagina have contained no pus, and all other signs of the infection have disappeared, a discharge containing gonococci recurs, we believe that this attack is frequently a reinfection, very possibly from the same source as the first."

R. M. Smith² says that "when the original source of infection still exists and no reform has taken place in the habits of the patient, a reinfection may easily occur and seems . . . more likely than that a relapse has taken place."

GONOCOCCUS INFECTION IN BOYS

Smith and McKee¹⁶ report a case of urethritis in a boy of 17 months. Gonococci were found in smears and in culture. The source of infection was probably the nurse.

Nicoll and Wilson¹⁷ describe a case of arthritis in a boy of 2½ years, following scarlet fever. Two of the joints became purulent and had to be opened. To their great surprise gonococci were found in the culture. Blood cultures were negative. The urethra appeared normal in every way, but two out of five cultures taken from it contained gonococci.

15. Smith, George G.: The Complement Fixation Test in the Management of Gonococcus Vulvovaginitis, *AM. JOUR. DIS. CHILD.*, April, 1913, p. 313.

16. Smith, A., and McKee, C. S.: *Brit. Med. Jour.*, 1913, i, 878.

17. Nicoll, M., Jr., and Wilson, M. A.: *Jour. Infect. Dis.*, 1913, xii, 52.

PYELITIS

Mode of Infection

Thomson¹⁸ in an excellent paper based on seventy-one cases of colon infection of the urinary tract in his private practice, says:

It is scarcely ever possible to decide in any individual case which route the bacilli takes in passing from their original harmless position to where they ultimately set up disease. It is, however, quite certain that they are sometimes carried there by the blood stream, sometimes pass in by the lymphatic channels, and sometimes ascend from outside by the lumen of the urinary tract.

When the bacilli reach the urinary tract . . . they are either washed out immediately . . . , or else destroyed . . . ; or they may remain for a time doing little or no harm. . . . If the virulence of the organisms has been increased by morbid processes in the intestine, or otherwise, or the normal resistance of the tissues lowered by local or general disease; or perhaps if there has been some retardation of the flow of urine . . . , then more or less violent inflammation . . . may be set up.

He then analyzes the sex incidence of the disease, making the following points:

1. . . . the number of girls is much larger than that of boys; among my cases the girls formed 79 per cent.

2. In the young infants . . . the disease begins more often with diarrhea than in older children. . . . Diarrhea is more frequently a marked symptom in boys than girls. [That is] cases setting in during apparent good health are commoner in girls than in boys.

3. Further . . . during the first six months of life far more boys than girls are affected, although after the sixth month girls largely predominated. When we . . . analyze the ages and sexes of 224 babies under 2 years taken at random from thirteen authors we find that . . . there is still a considerably greater proportion of boys during the first six months than at any later age.

4. The extreme rarity of rigors at the onset . . . in boys is noteworthy . . . when compared with the frequency of this symptom in girls . . .

5. Mild cases of *Bacillus coli* infection are rare in boys in my experience. In male patients the attacks of pyelitis are apt to be severe, and there is usually in them a much larger proportion of cases of fatal pyelonephritis than among girls.

In discussing these five points, he writes:

. . . the great preponderance of female patients seems . . . to force us to the conclusion that ascending infection by way of the urethra must be a common occurrence; and the excess of girls over boys probably represents the frequency with which urethral infection takes place. It seems very unlikely that the colon bacilli can force their way up the lumen of the male urethra. The greater prevalence of antecedent diarrhea in boys would probably cease to exist if we were able to subtract from the list of girls the primary cases infected *per urethram*.

The frequency of pyelonephritis in the male sex may be explained by the infection having usually in them passed straight from the bowel to the kidney and pelvis, and not having ascended from below. The facts that rigors are so very rare in acute pyelitis in boys, and in pyelonephritis in both sexes, while they are so common in acute pyelitis in girls (in whom we suspect an ascending infection) suggest the idea that the ureters may be the particular portion of

18. Thomson, J.: Lancet, London, 1913, ii, 467.

the urinary tract from irritation of which a rigor most readily arises. The frequency with which rigors are met with in ureteral calculus may be held to support this view.

Somewhat similar views are held by Wyman,¹⁹ who, from a study of sixty-five cases at the Children's Hospital in Boston, concludes that the ascending route is the common one in girls, and the hematogenous in boys, while what he calls the transparietal is rare in both sexes. An analysis of the age and sex of his patients gives the following:

Males under 2 years.....	= 37 per cent.
Females under 2 years.....	= 63 per cent.
Males over 2 years.....	= 10 per cent.
Females over 2 years.....	= 90 per cent.

The views of F. H. Smith²⁰ are less clear; he writes that "in the younger children and babies the infection is apt to be the colon bacillus, and most often from direct fecal contamination of the vulva, or possibly, by more direct route through blood or lymph paths to the kidney, upset bowels preceding the illness being highly suggestive of increased toxicity of the intestinal flora." In older children, however, he considers that "repeated attacks of acute tonsillitis, acute bronchitis and 'kidney trouble,' in sequence, suggest their interdependence."

Freeman²¹ believes in the ascending road of infection, because of the predominance of female cases.

Green,²² however, writes that pyelitis "probably proceeds by lymphatic extension from the intestine," while "acute inflammatory nephritis . . . is most usually hematogenous in origin." Nevertheless he includes as predisposing causes "calculi, constipation, phimosis, anal fissures and foci of infection elsewhere."

Cannata and Caronia²³ emphasize the necessity of preventing the early infections. Habitual constipation is dangerous because there is usually elimination of bacteria by way of the urinary apparatus. Fecal contamination of the vulva, phimosis and foreign bodies in the bladder, are the sources of ascending infections. Chilling, or any trauma to the bladder, is likely to prove an exciting cause. Stiner²⁴ also mentions the dangers of chilling.

Langstein²⁵ has reported two cases of pyelitis complicating Hirschsprung's disease, and also as a sequel to pertussis a fatal pyelitis due to Friedlander's bacillus. He writes that "in the future the hematogenous

19. Wyman, E. T.: Boston Med. and Surg. Jour., 1914, clxx, 540.

20. Smith, F. H.: Old Dominion Jour. Med. and Surg., 1914, xix, 77.

21. Freeman, Rowland Godfrey: Urinary Analysis in the Diagnosis and Treatment of Diseases of Infancy and Childhood, Jour. Am. Med. Assn., Nov. 21, 1914, p. 1802.

22. Green, R. M.: Boston Med. and Surg. Jour., 1913, clxviii, 645.

23. Cannata, S., and Caronia, G.: *Pediatrics*, 1914, xxii, No. 9.

24. Stiner, O.: *Cor.-Bl. f. schweiz. Aerzte*, 1914, xlv, Nos. 23-26.

25. Langstein, L.: *Med. Klin.*, 1913, ix, 1491.

and lymphatic mode of infection will be placed more in the foreground."

Kowitz²⁶ is practically alone in believing that the ascending route of infection is uncommon as compared with the hematogenous or lymphatic. He was led to this opinion first by finding that his own cases did not show the customary predominance of girls; in forty cases he had seventeen males to twenty-three females. "This does not seem to be such an overwhelming predominance of females that we can speak of an essential difference between the sexes." He then discovered in his cases the marked relation to the time of year shown in the accompanying chart.

Chart showing relation of occurrence of pyelocystitis to time of year.

To prove pyelocystitis a descending hematogenous disease, it is necessary to find a source of infection elsewhere in the body; that is, the acute digestive upsets of the summer. Pyelitis does not accompany, but follows the diarrheas. The frequency of colon bacillus infection is to his mind another proof of the hematogenous mode of infection.

Clinical Symptoms

Wyman¹⁹ has analyzed carefully the symptoms occurring in his sixty-five cases and gives the following list:

Vomiting	in 39 per cent.
Dysuria	in 36 per cent.
Pollakiuria	in 40 per cent.
Chills	in 15 per cent.
Abdominal pain	in 16 per cent.

Furthermore, he has found that pyelitis occurred as a complication of other disease as follows:

Otitis media	8 times	Pneumonia	7 times
Bronchitis	2 times	Infectious diarrhea.....	4 times
Typhoid	2 times	Intestinal indigestion.....	2 times
Measles	2 times	Tuberculous peritonitis	1 time

Gordon²⁷ separates the cases according to their clinical signs into these five groups.

26. Kowitz, H. L.: München. med. Wchnschr., June 16, 1914, p. 1341.

27. Gordon, R. G.: Brit. Jour Child Dis., 1914, xi, 252.

1. Symptoms of general feverish disorders, without any indication that one special symptom was affected.
2. Cerebral symptoms.
3. Pulmonary symptoms.
4. Abdominal symptoms.
5. Urinary symptoms.

Langstein²⁵ has a similar classification based on the dominating clinical symptom; that is, a toxic type, a meningeal, a pulmonary, a gastro-intestinal type, one associated with icterus, and one which gives most of the signs of appendicitis. He also mentions a form of pyelitis in which the urine contains many red blood corpuscles and only a few pus cells and says that this "is frequently the cause of erroneous diagnosis."

Thomson¹⁸ and Marsh²⁸ both emphasize the frequency of chills or rigors, the former saying that he does "not remember ever having seen an infant under 2 years who had had a well-marked rigor and who had no pus in the urine"; and the latter, that "shivering . . . is exceedingly rarely met with in infancy, except in this condition."

Stiner²⁴ mentions redness and swelling of the external genitals together with inability to urinate, as the initial symptoms of pyelitis which is brought on by exposure to cold.

Urinary Findings

Langstein's²⁵ hemorrhagic type must be again mentioned, the sediment consisting of "many red blood corpuscles, only scattered leukocytes, and perhaps here and there a cast. At the time it is difficult to decide whether this is the picture of a hemorrhagic nephritis, a calculus or a beginning pyelitis. . . . There are cases which proceed directly to recovery, provided proper medical treatment is instituted at once."

Freeman²¹ endeavors to draw a line between a normal and a pathological number of pus cells in the urine. According to him "1-2 leukocytes in a D-field (Zeiss) of precipitate [of centrifugalized urine] from a female baby does not indicate a pyelitis . . . That number in a male baby, or more in a female baby, should render the diagnosis suspicious." F. H. Smith²⁰ has a somewhat similar standard, although he does not find a difference between the sexes. He writes that "it is by no means exceptional to find as few [pus cells] as 3 to the $\frac{1}{6}$ field, and yet the symptoms be most severe."

Kowitz²⁶ has isolated the infecting organism in forty-four cases and confirms the predominance of the colon group, thus:

28. Marsh, N. P.: *Brit. Jour. Child. Dis.*, 1913, x, 385.

<i>B. coli</i>	24
<i>B. paracoli</i>	10
<i>B. lactis aerogenes</i>	7
Staphylococcus (cases of eczema and furunculosis).....	3
Mixed	3

Other authors have nothing new to add to the already well-known urinary picture.

Duration of the Disease

Thomson,¹⁸ Freeman,^{21, 29} Marsh,²⁸ Wilson³⁰ and others, agree that the disease may last untreated for several years and show few or no symptoms. It may flare up at any time, however. With correct treatment, Langstein²⁵ considers that 90 per cent. of the patients recover. In severe cases the patients may recover completely after three and one-half years, or the condition may lead to a contracted kidney or to a nephrosis. Marsh²⁸ gives a favorable prognosis, but adds that "before pronouncing the patient cured, the urine should not only show an absence of organisms and of pus cells, but should also be culturally free . . ." "In spite of all treatment, many cases become chronic; in these acute exacerbations alternate with long periods of quiescence, but the urine never becomes entirely free from pus cells and organisms."

Treatment

The one form of treatment against which no dissenting voice is raised is the administration of large quantities of fluid. Further than this, there is apparently no specific treatment. In many of the acute cases the patients get well untreated.

Thomson¹⁸ gives sufficient potassium citrate to maintain an alkaline reaction in the urine. Marsh²⁸ and Wyman¹⁹ agree with this procedure. The latter, however, favors changing the reaction of the urine back and forth by the alternate administration of potassium citrate and sodium benzoate. Freeman²⁹ says that "the alkaline treatment of pyelitis, while it is safe and will control many cases, is markedly less efficient than other methods of treatment. Langstein²⁵ goes so far as to say that alkalies are useless in the treatment of the disease.

Probably the best of the so-called "urinary antiseptics" is hexamethylenamin. It is pretty generally agreed now that it acts only in an acid medium. Freeman^{21, 29} considers it an "absolute antiseptic for certain infections of the urinary tract." He begins always with small doses of from $\frac{1}{2}$ grain to 2 grains several times a day, and then increases rapidly, being careful to watch the child and its urine for symptoms of irritation of the kidneys. "Large doses of hexamethyl-

29. Freeman, Rowland G.: The Diagnosis and Treatment of Pyelitis in Infancy, *AM. JOUR. DIS. CHILD.*, August, 1913, p. 117.

30. Wilson, H. W.: *Brit. Jour. Child. Dis.*, 1913, x, 289.

enamin should not usually be continued for more than a week at a time, and then after several days without any treatment, or with alkaline treatment, it should be started at the maximum dose given before and the amount increased daily until an influence on the urine is obtained. Doses of 25 grains daily in a child of 6 months, and 35 to 45 grains a day in a child of 9 to 12 months, may be safely given in this way to some infants." Wyman,¹⁹ as second choice to the alkaline treatment, gives hexamethylenamin and sodium benzoate. Cannata²³ uses hexamethylenamin alone or alternating with phenyl salicylate (salol), offering at the same time large amounts of an acid drink such as diluted hydrochloric or phosphoric acid. Marsh²⁸ and Thomson,¹⁸ representing the English point of view, are sceptical about the value of hexamethylenamin and phenyl salicylate. Kowitz²⁶ considers all urinary antiseptics useless, while Langstein²⁵ admits that hexamethylenamin may be of value as a prophylactic, but that "in severe cases more is accomplished by salol, in not too small doses (0.6 gm. to 1.0 gm. per diem)."

The value of vaccine therapy is still much disputed. Freeman,²⁹ writing in 1913 of renal infections with the colon bacillus, says: "Vaccines, either autogenous or commercial, are useful in controlling the constitutional symptoms of pyelitis." After another year's experience, he adds²¹ that they "produce a reduction in the temperature; but, so far as I know, the vaccines do not cure the disease, although they apparently cure it. The child loses its fever and will increase in weight and seem perfectly well, but when the urine is examined one finds the same pus and bacteria as before." Green²² and Wyman¹⁹ also advise vaccines, but only in resistant cases. Marsh²⁸ and Kowitz²⁶ are doubtful about their value. Wilson³⁰ reports a case in which autogenous vaccines were used without success. The parenchyma of the right kidney finally became involved, abscesses formed, and a nephrectomy was done which was followed by prompt recovery. Thomson¹⁸ reports that he has "used vaccines in a few cases, but with disappointing results." Langstein²⁵ has not only never seen good results from vaccines, but has also "seen a child on the second injection suddenly become very sick, with a high temperature and bloody stools." He considers that this may have been very probably an anaphylactic phenomenon.

TUBERCULOSIS

Renal tuberculosis in children is a very rare disease. Oraison³¹ reports three new cases, all in girls, bringing the total number of reported cases up to fifty-one. One of his patients had a severe Pott's

31. Oraison, J.: *Jour. d' urol.*, 1913, iv, 15.

disease, was not operated on, and died; the other two had nephrectomies; one apparently recovered and the other was lost sight of. Rocher and Ferron³² report a case, also in a girl, in which the offending kidney was removed with resultant cure. For diagnosis both articles advise cystoscopy and ureteral catheterization. It is surprising at what an early age this is possible, that is, in girls after 5 years,³² and in both sexes after 6 or 7 years.³¹ "The urethra admits easily a No. 40 tube 7 cm. long, and, in spite of the reduced field, the shortness of the tube permits the exploration of the bladder . . ." "The ureteral opening admits usually a No. 6 or No. 7 sound." "We have frequently employed general anesthesia, not because these manoeuvres are painful, but because the children became very often unmanageable with fright at the sight of the instruments."³² "Finally, the treatment of renal tuberculosis in childhood presents nothing unusual . . . It is better, even for an infant, to live with a single healthy kidney than with both kidneys, one of which is diseased and the other constantly threatened."³¹

Primary genital tuberculosis is also rare. Oliver Lyons³³ reports three cases in small boys. In two of these the infection was in epididymis and the patients appeared to be in perfect health. The onset was sudden with pain on palpation, edema of scrotum, effusion into the tunica vaginalis and enlargement of the testicle. "In the case in which the prostate and seminal vesicles were found infected, frequent urination was the first symptom noticed by the mother, but as the case progressed the irritability became so marked that the patient was unable to retain his urine more than twenty or thirty minutes at a time." Also, in contrast to the other two, he "presented a typical tuberculous appearance." From a study of his cases and of the literature, Lyons concludes:

For the true conception of these cases it is important to know that tuberculosis of these organs remains almost always the only tuberculous focus in the body; differing from later periods of life when it is frequently secondary to other processes in the genito-urinary tract. Therefore operation may produce permanent cure, although this is not always certain.

Graefe³⁴ has analyzed the necropsy protocols of eighty cases in all ages which showed tuberculous lesions in the female genitalia. He found nineteen of these to be in girls under 15 years old, which is a surprisingly high number. He studied these nineteen cases further and found that in all the lesions in the genitalia were secondary to tuberculosis elsewhere in the body. The distribution of the lesions was as follows:

32. Rocher, H. L., and Ferron, J.: *Jour. d' urol.*, 1913, iii, 153.

33. Lyons, Oliver: *Tuberculosis of the Genital Organs in Children*, *Jour. Am. Med. Assn.*, Dec. 6, 1913, p. 2051.

34. Graefe, G.: *Monatschr. f. Geburtsh.*, 1914, xl, 448.

	No. Cases	Per Cent.
Uterus only	0	= 0
Cervix	0	= 0
Tubes only	5	= 26.3
One tube only	3	= 19.2
Both tubes only	2	= 10.5
Uterus and both tubes.....	14	= 73.7
Both ovaries	3	= 19.2
One ovary alone	0	= 0
Uterus, both ovaries and both tubes.....	3	= 19.2
Vagina	1	= 5.3
Vulva and clitoris	0	= 0

"This table shows that in girls as in women the tubes are the most frequent site of genital tuberculosis."

The same cases classified according to age, give this result:

Under 1 year	1 case
1- 5 years	9 cases
5-10 years	2 cases
10-15 years	7 cases

The author has no explanation of the high figure for the 1 to 5 year period. The increase after 10 years, however, is probably due to the influence of puberty.

Holt³⁵ has reported a case of miliary tuberculosis following a ritual circumcision:

A healthy child, born of healthy parents, breast fed, developed local symptoms of infection within a few days after the operation and these persisted, being followed after a few weeks by symptoms of general infection which continued until death. The lesions found at the necropsy point strongly to a spreading of the infection through the lymphatic system beginning from the wound, and afterward to a general blood infection.

He abstracts the 40 previously reported cases, and says that of the 41 patients, 16 are known to have died, 7 are tuberculous, in 12 the final results are not known, and only 6 are stated to have recovered. For the treatment, he advises the early removal of the inguinal glands. He concludes "that syphilis is less frequently acquired in this manner than is tuberculosis," and that "it is the duty of the physician to raise his protest against the performance of ritualistic circumcision in every case."

Champtaloup³⁶ reports from New Zealand a similar case, except that the operator was a physician who has since died of laryngeal tuberculosis. The child was 7 weeks old at the time of the operation. The wound suppurated badly and after three weeks an abscess formed in the right groin. Another small abscess appeared in the skin and the child became emaciated and hectic. Champtaloup first saw the child when it was 10 months old, at which time smears and cultures of the pus were negative, although guinea-pigs inoculated at the same time

35. Holt, L. Emmett: Tuberculosis Acquired Through Ritual Circumcision, Jour. Am. Med. Assn., July 12, 1913, p. 99.

36. Champtaloup, S. T.: Brit. Med. Jour., 1914, i, 814.

showed a well marked tuberculosis in four weeks. The patient was treated with tuberculin and when seen eight months later was the picture of health.

PSEUDOTUBERCULOSIS

Scherber³⁷ has described an acute inflammation of the vulva which leads to an ulceration resembling tuberculosis. It heals readily under cleanliness and mild antiseptics.

RHEUMATIC ORCHITIS

Bass³⁸ describes a boy $2\frac{1}{2}$ years old who developed erythema nodosum and torticollis and four days later, while under salicylates, the scrotum suddenly swelled. "Examination showed the scrotum . . . twice its normal size. Marked local heat. Skin of scrotum edematous and dusky in color." The left testicle was enlarged and exquisitely tender, the right normal. The condition quickly disappeared and a month later there was "no atrophy of the testis."

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37. Scherber, G.: *Wien. klin. Wchnschr.*, 1913, xxvi, 1070.

38. Bass, M. F.: *Acute Rheumatic Orchitis . . . Associated with Erythema Nodosum and Acute Torticollis in a Child Aged Two and One-Half Years*, *Jour. Am. Med. Assn.*, May 21, 1913, p. 1608.