TRICHOMONIASIS

By

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In women leucorrhoea is a common complaint causing them lot of annoyance and anxiety; weakness, generalised pain, ill health etc have been attributed by them to it. In 1836.

Alfred Donne discovered the flagette 'Trico–monas vaginale' in the vaginal discharges. Since then it has be recognised to be more responsible for vaginitis than any other organism.

Though Trichomonal urethritis in men was first reported in 1883 by Kunstler it was not widely recognised and was considered to be quite rare till recently. The asymptomatic infestation in men, the relative mildness of the symptoms, the small number of protozoa present and the inadequacy of the diagnostic methods were probably responsible for the low incidence reported and for the great disparity in the sex incidence noted. But the effectiveness of Penicillin in the rapid elimination of gonococci, the improved diagnostic technics and a greater awareness of the disease have helped to uncover more number of cases. During the last two decades the infestation in men has come to gain a good deal of attention and wider recognition as definite clinical entity with a high incidence. Nowadays it is the first etiological factor to be considered in Non Gonococcal Urethritis.

REPORTED INCIDENCE IN WOMEN

" There have been wide variations in the figures in regard to the incidence of trichomonal vaginitis; higher rates have been reported from the Gynec clinics and venereal clinics, and lower figures from the general wards in unselected groups. Of the gynecological patients 6.9% (BUXTON et al, 1954), 12. 8. (Whittington. J. 1957), 15% (Kean et al 1954), 24.6% (Peterson, 1938), 26% (Reich and Button, 1947), 35.6% (Jirovec, 1942), and 85% (E. Siebert, 1952) were found to have Trichomonal vaginitis. The percentages reported from various, venereal clinics were:—21.3% (M. J. Whittington, 1957), 25.2% (Rama ayyangar, 1963), 38% (Dunlop and Wisdom, 1965) and 45% (Mascall, 1954). In their studies the protozoa were found to be responsible in 60% of women with leucorrhoea (Durel, 1959), J. H. Morton, 1943. M. J. Whittington (1957) has reported Tr. vaginitis in 5.3% of women attending birth control clinics, FEO et al, 1956 in 12.9%, Trussel, 1947 in 20–25% of women in U. S. A. and KEAN (1955) in 20–30%..... ..

Certain investigators have found the infestation in 73% of the prostitutes (Bedoya et al, 1958), in 70% of women prisoners and in 15% of the mental patients examined. The disease was found to be more common in pregnant women (who had super abundance of oestrogens) than in the non pregnant (Trussel), and more in women who used contraceptives than in others. The highest incidence was during the period of

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sexual activity though it was also seen after menopause (12.9% FEO et al, 1956, 14.7% Kean, 1954), befor menarche (Kleegman, 1955), and rarely in infants and children (Peter, 1957). Trichomoniasis was found associated with Moniliasis (in 6% Dunlop and Wisdom, 1965), with genital warts (in 4.3%) and with gonorrhoea (in 30.2% Dunlop, 1965 and in 42% J. H. morton, 1943).

INCIDENCE IN MEN

Different investigators have reported figures varying widely from 5.3% to 68%. COUTTS et al, 1955–68%, FEO et al, 1956–41% SCHULTZ, 1958–25%, Whittington, 1957–15.3%, DUREL et al, 1954–12.1%, JIRA et al, 1955–10%, WISDOM & DUNLOP, 1965–5.6% and LANCELY 1953-5.3% of N. G. U. cases. The trichomonads were found in 4% of the men examined by ROTH, 1944, in 8.8% by JIRA et al, 1957, in 11% by SIBOULET. A, 1959, in 15% by VERHEYE & KANDA, 1958 and in 18% by FEO et al, 1956. Trichomonal urethritis was 4% of all cases of V. D. (Liston and Lees, 1940). In their studies Buxton, Riba, and Stuhler found T. Donne in 3.9%, 0.3% and in 0.005% of the prostatic massage secretions examined by them. However in the male the infestation is more common than is generally thought. It is commonest in the 30 to 50 age group. Though KING; A. J. Mascall, 1936, Liston and Lees (1940), and Allison (1943) have reported that TR. urethritis and Gonorrhoea were frequently associated in the males Wisdom & Dunlop, 1965–8.8%; Feo et al, 1956; & Rama Ayyangar, 1963 (2.2%) have found it to be rare. In both sexes the infestation is found to be more prevalent in the married than in the single (Buxson et al, 1958) and more in the negroes than in the whites; (Roth; Watt Jesenison, 1960; Trussel, 1947; BURCH et al, 1959).

INCIDENCE IN THE SEXUAL PARTNERS

(A). The infestation in the male consorts of women with TR. vaginitis was found in 3.4% (Mascall, 1954), in 6.6% (Bernsteine & Rakoff, 1953) in 12% (Harkness, A. H, 1950), in 25.3%. (Karnaky, K. J. 1935), in 26.5% (Rama ayyangar, 1963) and in 33% (Whittington, 1957). Prostatic secretions examined revealed a higher incidence in the male consorts (40 %)–COUTTS et al, 1955. (B). Burch et al, 1959 found the infestation in 41.9%; Verheye & Kanda, 1958 in 47%; Rama ayyangar 1963 in 58.2%; Drummond, A. C, 1936 and SIBOULET. A in 80% and Catterall & Nicols, 1960 in 100% of the women consorts of men patients. There is thus a high incidence of trichomoniasis in sexual partners but in the male probably it is either asymptomatic or it is difficult to diagnose.

EPIDEMIOLOGICAL ASPECTS

The parasite belongs to the Genus TRICHOMONAS, in the Family of TRICHOMONADIDAE, in the Order of ZOOMASTIGINA, in the Class of MASTIGOPHORA (Flageliate) and of the Phylum of PROTOZOA. The trichomonads are wide spread in nature & affect besides human beings insects, fish, reptiles, frogs, birds, mice, guinea pigs, rabbits, cats, dogs, cattle (T. Foetus), horses and monkeys mostly as saprophytes. There are 3 species of it in mankind. (1) T. VAGINALIS of the genitourinary tract. As it is not confined to the vagina it is not quite correct to call it so; better it is

termed TR. DONNE. (2) T. tenax (T. buccalis, T. elongata) found in the mouth and (3) T. hominis (T. intestinalis, T. faecalis) found in the bowel."–WILLCOX, 1960.

The T. DONNE are fusiform, oval or pear shaped, measuring 15 mu x 8 mu, with 4 free anterior flagella of equal length (15 mu), arising from the Blepharoplast at the rounded anterior end, an ovoid nucleus, an undulating membrane with a thicker posterior flagellum on its margin extending up to the middle of the body on oneside and a posterior axo style which bends round the ventral side of the nucleus. They are actively motile with brisk lashing of the flagella and at times show amoeboid movement. They live on the surface & are not tissue parasites. They have no cystic phase. The protozoa have been recovered from the vagina, vaginal portion of the cervix, Bartholin's ducts, uretera, rectum, sub preputial mucosa, prostate, epididymis, & bladder. They multiply when the vaginal state is favourable (i.e.) P. H. is 5–6 but die if the acidity is increased; they do not multiply within the cervix or its glands because of the cervical mucus. They have been also found in the lungs, liver abscess and even in the placenta, umbilical cord and viscera of a foetus obtained by Caesarian section (Quoted by KRISHNAN, K. S; 1957). TR. Donne have been cultured from the blood of the infected women (HEES, 1938).

A certain degree of moisture and heat are required to keep them alive; they are notoriously susceptible to drying. They do not multiply at room temperature. The flagellates produce gas and acid by fermentation of carbohydrates. Inoculation experiments and serological reactions (Agglutination, Complement fixation, Fluorescent tagged antibody) have suggested that different distinct strains including non pathogenic ones exist in this human type. No immunity is acquired by the infestation.

Culture. The flagellates can be cultured in artificial media under partial anerobic conditions, using whole blood or 5% human serum in Ringer's solution or Cysteine Peptone–LIVER and Maltose medium or LASH's serum medium to which Cysteine has been added or LOEFFLER's dehydrated blood serum medium. However the best & most valuable medium is that of FEINBERG–WHITTINGTON (1957).

It consists of Proteolysed liver, sod. chloride. dextrose, inactivated horse serum, Penicillin, Streptomycin and distilled water. It is cheap and simple. To 10 C. C. of the medium 1 or 2 drops of the secretion (preferably a larger inoculum) are added & incubated at once at 35–37°C under anaerobic conditions for 2–5 days. The growth is found at the bottom of the centrifuged culture tube after 48 hours. Sub cultures are done every 2–4 days.

The three species of Trichomonads are according to some parasitologists, distinct; (Liston, Bernsteine and Rakoff). Clinically too there is little direct association between the three infestations. But others hold that they are but variants of the same organism, the morphological differences being due to their habitat and environment. Tr. hominis are smaller than Tr. Donne; they have 5 anterior flagella and a trailing posterior flagellum. The former are found in 3.5% of patients with gastro intestinal diseases (Trussel, 1947) and can live for 24 hours in faeces, multiply at room temperature and

survive in media without serum. Tr. buccalis have the same type of flagella & undulating membrane as Tr. donne but are smaller & can multiply at room temperature. Serological reactions show their differences.

PATHOGENICITY

Though Tr. donne may be found associated with leucorrhoea and with urethra discharges yet its etiological role is not known definitely. It is a frequent inhabitant of the vagina in 20–60% women who have no complaints (A. H. Harkness; J. H. Morton 1943); it also occurs in the urinary tract of some men without causing any symptoms & signs. Some consider it to be a harmless commensal and the patients to be mere carriers of the trichomonads. Tr. donne as well as secondary organisms such as Strep to non hemolyticus (Hesseline), Staphylo cocci, diphtheroids, E. coli etc are also seen in the discharges (Lowsly & kirwin, 1956) in many cases of vaginitis & urethritis. Years ago the vaginitis was considered to be due to the secondary organisms (Hibbert and Falls, 1938) and the trichomonads to be saprophytes which merely flourished in the discharges. Some considered that T. donne remained dormant but become pathogenic only when the vaginal PH became altered to a favourable 5–6 or when they became associated with secondary organisms. Rosenthal held that the protozoa became virulent in the lower urinary tract of males when bacteria gained entrance into it. Thus a symbiotic association of Tr. donne with other bacteria was considered to be an important factor in contributing to the clinical picture. Other conditioning and adjuvant factors are uncleanliness, local trauma, cervical erosions, debility after illness etc. JIRA et al, 1957 have postulated that the different clinical pictures–carrier states, acute and chronic–may be due to differences in the size of the infesting dose, virulence or distinct strains of the trichomonads with variations in their morphology, antigenic behaviour and sero types. However others (M. J. Whittington–Mascall) hold that the clinical variations are due to the different responses of the host–age, condition of mucosa, anatomical anomalies & general resistance, rather than to the specific strains of Tr. donne. It is generally now accepted that the clinical entity in Trichomoniasis in both sexes is primarily caused by the protozoa, because clinical cure occurs only when they are eradicated.

MODE OF INFESTATION & TRANSMISSION

(1) In case of men sexual intercourse with women harbouring the trichomonads is the prime factor (Liston and Lees, 1940). However in the case of women, there is much speculation about the mechanism of spread; the source is difficult to state and the mode of infestation not well understood. Women were considered to be the reservoirs and men the transmitters. Even in women the importance of sexual transmission has been increasingly stresssed in recent years. Though there is much clinical evidence in favour of this, such as the high incidence of trichomoniasis in the consorts, the ease with which the flagellates die outside the human body and the association of the disease with veneral diseases (Dunlop and Wisdom, 1965) this does not explain the incidence in all women particularly in children and Virgins. (2) The second possibility which occurs in some is *Fomite–Contagion* (i.e.) *Direct Contact* with contaminated

inanimate objects such as soiled linen, damp towels (Burch et al, 1959), bath sponges, toilets, toilet seats (Mccullagh, 1953), douche nozzles, rubber gloves and specula. (3) *Indirect contact* too may play a significant part. Contaminated bath water (Davies C. H.), swimming baths, sea bathing (Campbell), bathing in small pools and tanks have been incriminated. It must however be remembered that soap as well as chlorination of water kill the trichomonads. "Indirect transmission is more likely to occur in over crowded and unhygienic conditions in which personal hygiene and habits are less fastidious." (4) The old theory that the vaginal infestation may arise from the bowel, the T. hominis getting transferred from the anus and transformed morphologically has not been substantiated and hence stands discredited. The three trichomonads are found associated in the same patient only in rare instances; (Liston and Lees, 1939). Thus there is no support for this theory of *intestinal origin* of the disease. (5) It is not also accepted that *animals* may act as reservoirs. (6) *Relapses* in women may be due to reinfestation from the untreated sexual partners or from some extra vaginal site inaccessible to the local therapy used. The urinary tract (Skene's glands) acts commonly as reservoirs of infestation.

CLINICAL MANIFESTATIONS IN WOMEN

There are great variations. In some the infestation is subclinical and symptomless but in others there may be distressing vaginitis. The following *symptoms* may be present. (1) In 75% Vaginal discharge. (2) Vulval soreness; burning and irritation WHICH become worse after periods. (3) Genital pruritus which though persistent is not as intense as in moniliasis. (4) Dyspareunia, Dysmenorrhoea and lower abdominal pain in some. (5) When urethra is involved Dysuria, frequency and urgency of micturition.

The *signs* are: (1) The commonest is purulent vaginal discharge which varies in colour from yellowish grey to cream white. It is thin and purulent but may be creamy in 30% or thick; acid in reaction (PH 5–6) and malodourous (in 7–10%). Pathognomonically the discharge is *foamy or frothy* due to fermentation of carbohydrates. It is profuse especially after periods. (2) *Vulvitis and Perivulvitis.* The vulva is swollen, inflamed, chafed and frequently there is an intertrigo extending down the thighs. (3) *Vaginitis.* The colour of the vagina is altered from the normal pink to deep red; the mucosa is congested and tender; it has a granular appearance (Straw berry) due to the prominence of its papillae. Rarely in severe cases in its posterior half it has a raw-beef, flea-bitten appearance due to minute hemorrhagic areas. (4) The *cervix uterus* though normal mostly may be in some chronic cases oedematous and eroded. (5) Bartholin's glands are inflamed (6) *Urinary tract.* The Skene's and paraurethral ducts are frequently affected (25% cases:– Dunlop and Wisdom, 1965; in 50% Reich, 1947; in 75% Whittington, 1957 and in 98% Bedoya et al, 1958) and yellowish discharge is seen at the inflamed urinary meatus. The trichomonads may invade the bladder when there is concomitant bacterial infection, leading to cystitis and may also cause Pyelitis (Nitchske, 1936). (7) Trichomonal vaginitis may be asociated with Gonorrhoea and with vaginal Moniliasis especially in pregnant women and in

diabetics. (8) Proctitis may occur. (9) Cytological studies at Roosevelt Hospital, New York have revealed a higher incidence of cancer cervix in trichomonal cases. (10) Psychic trauma, mental strain and Neuroses may be caused.

CLINICAL MANIFESTATIONS IN MEN.

They vary considerably in nature and severity. Many men harbouring the trichomonads are symptom free, are unaware of the disease and are probably carriers (18% Wisdom and Dunlop, 1965; 40% Rama ayyangar 1963; 60% Feo et al, 1956); as the infestation is silent the disease goes undetected. (2) The symptoms are acute in 15% and chronic in the rest (Coutts et al, 1955); they are mostly mild; they may be self limiting in some (McEntegert, 1953; J. Whittington, 1957). (2) Urethral discharge–not complained of by some. (3) Itching of ext. ur. meatus, Dysuria and imperative micturition. In some these only may be complained of. (4) Rarely painful erections or ejaculatio precox.

The signs are:—(1) *Urethral discharge.* variable in type and nature (occurs in 64%). It is usually slight or scanty; in chronic cases the most common form is the *Morning Drop* (Coutts et al, 1957). Rarely it is profuse. The discharge is either thin, watery, creamy, or thick; it may be mucopurulent or purulent. (2) In the untreated the post. urethra, prostate and vesicles become rapidly involved leading invariably to *Prostato–Vesiculitis*, so that Trichomoniasis is an important cause of chronic Prostitis. (3) *Balanoposthitis* (Gaudin, Soubigar et al, Wisdom and Dunlop). (4) In some cases *Epididymitis* occurs (Liston and Lees, 1940; KING, A. J. 1957) and in few others *Cystitis* (in 5% WISDOM & DUNLOP, 1965) and *Pyelitis* (Rosenthal, 1931; Lewis and Carrol, 1928; Liston and Lees) occur. (5) In chronic cases *stricture urethra* (Riba and Harrison, 1936), *fertility disturbances* (Keutel, 1958) may be caused. (6) The Tr. urethritis may be associated with gonorrhea, spirochaetal and nonspecific urethritis; it becomes more easily discernible after treatment of the other concomitant infections. (7) Metastatic Complications such as Osteomyelitis (MOSSEY) and Arthritis (Coutts et al) have also been reported. Thus Trichomonal infestation is a systemic disease.

LABORATORY DIAGNOSIS

It is advisible to use a combination of the following methods. (1) Examination of *Wet–Mount* preparations of the secretions, urine, etc. (2) *Culture in* artificial media. (3) *Fixed Stained smears.* (4) Phase contrast microscopy.

(1) *Wet mount preparations.* Before taking specimens no douches, antiseptics, jellies or lubricants should be used. (a) A loopful of the discharge from the pool in the posterior fornix should be mixed with a drop of saline on a slide, covered with a cover slip and examined at once before it dried up; the slide may be just warmed at intervals. Addition of 5% aq. solution of Fluorescin, as advocated by Coutts et al, would stain the trichomonads brilliant green. Plenty of epithelial cells and many pus cells are seen, as also the actively motile pear shaped flagellates. (b) In case of males, the urethral discharge should be examined similarly; the

patient should not have passed urine for at least 3 HOURS prior to investigation. If scanty, the dischatge should be obtained by massaging the ant. urethra. This and in chronic cases the "morning Drop" should be examined., preferably by DARK–FIELD microscopy as there are only few protozoa. The slide should be examined thoroughly and diligently for 10–15 minutes. There are plenty of epithelial cells arranged in a sort of flat mosaic pattern but the pus cells are few; the trichomonads are few, round in shape and are seen at the margins of the specimen. At the same time Fuso spirochaetes, when present, are easily seen". (Rama ayyangar, 1963). Lancely, 1954 advocated gentle stroking of the forsa navicularis with a platinum loop and examining the scrapings obtained. To come to a definite conclusion the investigation, if negative, must be repeated on several days. (c) In women too the vulva must be cleansed, dried and the *urethral discharge* expressed on massaging from above downwards the floor of the urethra through the ant. wall of vagina must be examined. (d) In male the *prostato–vesicular secretions* after a prostatic massage should invariably be investigated similarly (Oates, 1958). (e) Specimens taken from the *subpreputial mucosa* in the uncircumcised should also be examined. (f) *Urine sediment.* When the urethral discharge is scanty 15 c. c. of recently voided urine must be centrifuged for 5 minutes at 1500 r. p. m. and the deposit examined. In cases with bladder symptoms a catheterised specimen of *residual urine* may be examined but this is less useful. In addition in males *urine* voided after a prostatic massage should be taken for similar investigations.

(2) *Culture Methods.* Examination of fresh wet preparations alone are not reliable and sufficient. Though JIRA et al, 1958 hold that no significant advantages are offered by them, culture methods are distinctly and definitely superior as they give more positive resuls (Whittington. J–1957; Nicols, 1958; Kean and Day, 1954). They are simple, efficient and should be undertaken as a routine measure. Two or three loopfuls of vaginal or urethral discharge or prostatic secretions or $\frac{1}{2}$ c. c. of urine sediment should be inoculated by STENTON's method (1957) into the Feinberg Whittington medium. Candida Albicans when present will grow in it. STUART's swab may be used for transport. *Culture of prostatic secretions* give the best results.

(3) *Examination of Stained Smear,* though favoured by some investigators like Jira et al, 1957, Jirovec, 1950, Sorel, 1954, Coutts, 1954 and Liston and Lees, because sec, organisms as well as Candida are also seen if present, is not entirely satisfactory (Whittington. J.). The methods advocated are Giemsa, Romanowsky and Gram's staining.

(4) *Use of Fluorscent Antisera in detection of serological varieties of Tr. donne: McEntegert 1958.* In rabbits the Antitrichomonas serum is prepared, its globulin fraction seperated, and conjugatd to Fluorescein Isocyanate. It is purified by repeated fractionation so as to avoid non specific staining and then applied to acetone–fixed smears from pure cultures of the protozoa. The labelled antibody coats the corresponding antigen and is seen when examined by U. V. Fluorescence microscopy.

This is useful to find out the antigenic differences in the various strains but is unsuitable for identification of the flagellates in smears.

DIFFERENTIAL DIAGNOSIS

(A) Leucorrhea due to (1) *Monilial Vaginitis* characterised by (a) Intense pruritus–worse before periods. (b) The discharge is slight to moderate; it is white, flaky, cheese–like and odourless. (c) Vaginal PH is 5.5–6.5. (d) Irregularly distributed thrush patches seen. (2) Due to other causes such as RETAINED products of conception, or blood clots, Endocervicitis, endometritis, Cervical erosions, Tumours of the uterus: Fibroids, Polypi, cancer cervix; uterine displacements, Pyometra, Hormonal causes, General conditions such as Debility and Anaemia. (B) *Non specific urethritis* due to Fuso spirochaetes, virus, Bacteria, PPLO organisms, trauma etc.

TREATMENT

(1) The most essential part of successful therapy, whatever method or drug is used, is to *treat the sexual partners* simultaneously so as to prevent reinfestation. (2) Till recently there was no generally accepted specific drug or method of therapy. Though there was immediate subsidence of symptoms, treatment of even women has been unsatisfactory as no systemic therapy was effective and as the locally administered drugs did not reach all foci of infestation. Treatment of male patients was more unsatisfactory, though some methods gave temporary relief. So the need for an ideal systemic Trichomonacide that could reach the genito urinary tract was great and it was fully met with when METRONIDAZOLE was discovered in 1959. With its introduction in therapeutics, the gamut of drugs hither to used and the several methods employed so far have all become obsolete and things of the past and of historical interest. The very multiplicity of chemicals and antibiotics used till recently only bears a mute but striking testimony to the general ineffectiveness of them all.

TREATMENT IN WOMEN

(A) *Vaginits.* Various chemicals such as antiseptic solutions, douches, suppositories, medicated jellies, hormones, antibiotics as well as physical agents have been used with varied success Prolonged as well as combined therapy was necessary in many cases. The varied methods were: (1) Thorough drying up of the vagina. (2) *Acid douches* of Lactic acid 1–2 tea spoons or Vinegar 4 table spoons in 2 quarts of water–preferred to antiseptic douches. (b) Swabbing of vagina with conc. sod bicarb solution. (c) *Carlendicide* douches (a drachm to two pints) (Carl. H. Davis and Grand. (3) The standard remedy in vogue till recently was (i) *Acetarsol vaginal suppositories* as (a) *S. V. C.* tablets (M & B). Two tablets daily were introduced into the posterior fornix and kept in place by tampons at bed time for 14 days and this was repeated after each of the next 2 or 3 periods. Rarely sensitization reactions to Arsenic did occur on prolonged use. Other suppositories used were (b) *Devegan* (Hoechst) containing Acetarsone, CH and Boric acid. (c) *Vagiflav* (Boots). Other preparations used locally, especially when sec. organisms also were present were (ii) *Diodoquin* vaginal tablets in the form of (a) *Floraquin* (Searle), *Viozo*, Ciba,

Gyno sterosan (Geigy). (iii) *Desulan* (Cilag) containing Pyridine mercuric chloride, sulfonamides, and lactose. (iv) *Aroxine* pessaries (B. W. & Co.). Later came into use suppositories of *Terramycin, Aureomycin etc* and they were found effective (Mcvay et al 1951). *Furazolidone* (Furoxone–boric acid) vaginal tablets and the *Trichomycin* pessaries were found to be ineffective. Local therapy with suppositories had to be followed by Acid douches or Jellies to promote the normal vaginal flora. In women after menopause *Dinestrol* vaginal cream was applied for 10 days prior to therapy with pessaries.

(4) *Application of Jellies or creams* containing Trichomonacides (TETRONYL) to the posterior fornix 5 C.C. twice daily for 3 to 4 weeks, after a preliminary cleansing saline douche preferable to the suppositories. (5) *Painting* the vaginal mucosa or *spraying* or *inserting tampons* saturated with Antiseptic solutionseither 5% Mercurochrome, 1% Gentian violet or 1% Picric acid, or 10% Argyrol, or Metaphen aq. 2% Silver nitrate, Or Carlendacide 1 in 250 aq. solution.

(6) *Drugs for insufflation.* After preliminary douching, *Insufflation* twice a week, of powder containing Stovarsol, Salicylic acid, Kaolin and sod. bicarb or Silver picrate and kaolin Negatol), or VIOFORM or Aureomycin and Talc. But the danger is that during pregnancy fatalities occur due to air embolism. Lately TETRONYL (a mixture of 2 quaternary Ammonium compounds) once a week for 4 weeks was advocated.

(B) The *cervical canal* was treated by introducing an applicator dipped in Metaphen 1 in 1000 and *the Urethra* by daily irrigations as inmales.

Treatment in Males has been quite unsatisfactory though number of urinary antiseptics have been nsed for irrigation or instillation, because the prostatic glands were not reached. (1) Large doses 30 grs t. d. s each of Pot citras and Sod bicarb *orally* for 2–3 weeks (Liston and Lees); it may be combined with urethral irrigations with Sod bicarb one drachm to a pint (Willcox). (2) In acute cases daily *urethral irrigations* with any one of:– Silver nitrate (1 in 5000 increasing to 1 in 500), Acriflavine 1 in 1000, or Argyrol 5%, Pot permanganate 1 in 8000. Mercurochrome, Mercuric oxycyanide 1 in 10,000, Zephiran 1 in 3000, Metaphen 1 in 5000 or Nitrofuran derivatives 1 in 10,000. (3) Daily *urethral instillation of* Acetarsone emulsion, or Aureomycin 250 mgm. in 5 c. c. water or Tr. merthiolate 1 in 1000 1 to 2 c. c. after anaesthetising the urethra.

(4) *Local use* of Carbarsone rods (Jira, 1958), Stovarsol urethral suppositories or Jelly (Willcox).

(B) In Balano posthitis washing with soap and water and applying Penotrane ointment (Wisdom and Dunlop, 1965). (C) *Prostatic massage* once or twice a week when the prostate was involved.

SYSTEMIC THERAPY

(A) The following have been used orally. (1) *Calcium mandelate* (STRAIN). (2) *Diodo hydroxy quinolines* no clinical response. (3) *Aureomycin* 2–3 Gms daily

for 7–10 days (McVay et al, 1951), in Tr. urethritis. (4) *Anti malarial drugs* such as Atebrine (Mepacrine) 0.1 Gms t. d. s for 8 days (Willcox), Chloroquine ½ Gm daily for 18 days, Primaquine (25 mgm daily for 14 days). Not effective. (5) *Aminitrazole* as well as the oral antibiotic *Trichomycin* (Tritheon, Trichorad 100 mgm t. d. s for 6 to 14 days) found clinically ineffective though effective IN VITRO (Willcox, 1957; Dunlop et al 1958, Nicol and Catterall, 1957). (B) *Emetine* injections in chronic cases (COUTTS).

FLAGYL IN TRICHOMONIASIS.

The above mentioned drugs have been superseded by METRONIDAZOLE *(Flagyl)* 8823 R. P., which has a molecular formula of $C_6H_9O_3N_3$. Cosac and julou (1959) demonstrated its trichomonicidal activity IN VITRO as well as in the mouse. The first clinical reports of its use in male urethritis (Durel et al, 1959) showed excellent results but in women the oral treatment had to be supplemented with administration of pessaries. Their findings were confirmed by Sylvestre et al, 1959 who had 100% results in males. Nicols, 1960 and Rodin and King, 1960 treated women orally with success and found local therapy unnecessary. Willcox, 1960 found spectacular immediate results in 94%; Chesney et al and Scott Gray, 1960 had similar succsses. Wisdom and Dunlop, 1965 found 70–90% of the patients free of symptoms after 3 months. Nicol c. s, however tried a 5 day course, met with failures and abandoned it.

FLAGYL (M & B) has a high trichomonacidal activity; it has no action against Monilia or other bacteria (J: Chesney); nor does it interfere with normal growth of Doderlein's bacilli; it makes the vaginal PH return to normal. The dosage usually used is one tablet (200 mgm) t. d. s. for 7 days. The drug is remarkably effective even in long standing cases. Failure may occur when the absorption is poor, in pregnancy, in stricture urethra and in cases of resistant strains of trichomonads. The drug is well tolerated even in children but has to be used cautiously in early months of pregnancy. No serious side effects are common. A few may have nausea, unpleasant taste, dry mouth, loss of appetite, headache, dizziness, skin rash scarlatiniform or pustular and rarely a fall in total W. B. C. count (Rodin et al, 1960), Flagyl is far superior to any other preparation and is an effective systemic cure for Trichomoniasis in both sexes. No additional treatment is necessary in uncomplicated cases; but urethral stricture should be dilated periodically. It is essential that the sexual partners should also be given a course of Flagyl therapy concurrently. The patients should be kept under surveillance for another 3 months, during which period wet smears and culture tests should be done fortnightly and blood examinations weekly. In treatment failures, retreatment with higher doses (1GM daily) and Pessaries locally in women have been advocated.

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