THE INCIDENCE OF VENEREAL DISEASE IN AN INDUSTRY

A SURVEY OF 259 CASES

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The South African Rubber Manufacturing Company Limited (SARMCOL) has its plant at Howick, Natal. Howick lies on the main Durban-Johannesburg road, and is quite a small township. The rubber factory is the only large industrial organization in the township.

The Company takes an enlightened view of its responsibilities to its staff at all levels. The non-Europeans who make up the main body of workers present special problems, e.g. housing, nutrition, separation from families, income levels, and exposure to venereal disease. The incidence of venereal disease in this group forms the subject of this discussion.

Considerable growth of the Company has occurred. In 1919 the number of employees was just over 100. The total number of employees in January 1963 was as follows: European 412, African 1,455, Coloured 53, and Asiatic 328.

SARMCOL is the largest employer of labour in the rubber industry in this country and manufactures a very large range of articles.[1]

Non-European Labour

The non-European labour for this industry is drawn essentially from 3 sources:

1. The rural areas surrounding Howick. Many of these men live in the Company Compound separated from their families. Only Africans are housed.

2. The Native village of the Borough of Howick. Only Africans are housed; many live with their families.

3. The sprawling non-European areas around Howick. These are under the control of the Local Health Commission. Asiatics, Coloureds and Africans live here, many with their families. Overcrowding in the areas where the Coloureds and Africans live is a source of concern to the responsible authorities. Unemployment in this district appears to be common. Shebeens provide a constant problem to the police, and are sources of contact for venereal disease.

DETAILS OF THE STUDY

The material for this study concerned 259 non-European employees — all males (Table I). Before 22 September 1958 new employees were superficially examined by the part-time medical officer. After 22 September 1958 all new non-European employees were examined systematically; the findings were recorded and blood samples were submitted for serologic tests for syphilis (STS). In this way 949 samples were submitted to the Government Laboratory, Durban, between 22 September 1958 and 18 February 1963. The help given by the Laboratory is acknowledged at this stage.

At different times, two types of test were made: (*i*) complement-fixation tests, e.g. Wassermann and Kolmer tests, and (*ii*) a flocculation test, e.g. the VDRL test. The flocculation test was discontinued by the laboratory in November 1960, except where specially requested. Since that date samples have been submitted for the Wassermann test, and since 10 January 1963 for the Kolmer test.

Of a total of 949 blood samples submitted, 130 showed positive or doubtful reactions. The percentage of positive reactions was 13·7%. Doubtful reactions have been arbitrarily accepted as positive, and treatment offered. As a justification for this viewpoint, of 11 cases treated 8 were converted to negative, 1 is still under treatment, and 2 were paid off while under treatment.

TABLE I. CLASSIFICATION OF VENEREAL DISEASES TREATED

	Number	*Percentage*
(*a*) With positive STS only	151	58·3
(*b*) Primary lues	15	5·8
(*c*) Secondary lues	7	2·7
(*d*) Tertiary lues	3	1·2
(*e*) Urethritis (probably gonococcal)	56	21·6
(*f*) Urethritis — with epididymitis	7	2·7
(*g*) Lymphogranuloma inguinale	5	1·9
(*h*) Chancroid	4	1·5
(*i*) Combined infections	3	1·2
(*j*) Probable venereal infections	8	3·1
Total	259	100%

(*a*) *With Positive STS (151 Cases)*

In the period 22 September 1958 - 18 February 1963 949 blood samples were submitted. The employees of this Company work approximately 49 weeks a year, and between 22 September 1958 and 18 February 1963, there are approximately 173 weeks of work. An average of 5·5 blood samples are therefore submitted per week. 130 cases with positive STS were discovered in the period 22 September 1958 - 18 February 1963, and 21 cases with positive STS were found before routine submission of blood samples was undertaken. 151 cases with positive STS are therefore included in this discussion.

Treatment. Each of the above patients received penicillin (procaine penicillin B.P. 'distaquaine') by intramuscular injection. The recommended dose of penicillin totalled 4,800,000 units.[2,3]

The actual number of injections varied according to the nature of the patient's work and his acceptance of discomfort, but as a rule the course was completed in 8 injections. The men were all at work, and most employees work a 10-hour shift. It was important to inconvenience the men as little as possible, and at the same time ensure adequate treatment. Where the STS remained positive after a course of injections, the course was repeated.

Results of Treatment

	Number	*Percentage*
Serology converted to negative in 1 course	49	32·5
Serology converted to negative in 2 courses	20	13·2
Serology converted to negative in 3 courses	7	4·7
Serology converted to negative in 4 courses	3	1·9
Serology converted to 'doubtful' in 4 courses	5	3·3
Injections stopped as a result of reactions	8	5·3
Not converted to negative after 4 courses	29	19·2
Paid off while under treatment	30	19·9
Total	151	100

Of the patients fully treated, 79 (52·3%) showed a reversal of positive serology. A further 5 (3·3%) showed conversion from positive to doubtful serology. It is possible that these figures could have been improved had the 30 who were paid off completed the treatment.

The 29 patients in whom the STS remained positive after 4 courses of treatment remain under observation.

(*b*) *Primary Lues (15 Cases)*

All 15 patients presented with a chancre located on the glans penis. In 14 the chancre was single and in one 3 deep, indurated lesions were present. The ulcers in the remainder

were all deep, with a hard, indurated edge. The incubation period varied from 12 days to 6 weeks after exposure, which may be considered normal.[4] Dark-ground facilities were not available, and diagnosis had to depend on clinical grounds plus the history. It is acknowledged that this may be unsatisfactory,[4] but the author obtained a reasonable experience of diagnosing venereal disease during the last war and as a district surgeon for 14 years.

Fourteen patients had a negative serology, which remained negative after treatment, and 1 had a positive VDRL reaction, reversed by one course of penicillin.

(*c*) *Secondary Lues (7 Cases)*

One patient presented with interstitial keratitis. He complained of slight haziness of vision, and on examination the corneae were hazy and there were several small opaque areas in the periphery of the corneae. The STS was positive and was reversed after the third course of penicillin. The haziness cleared, but the opaque areas have remained. The fundi appeared normal.

The remaining 6 patients presented with skin rashes. The rashes were macular in type, generalized, not itchy, and in one patient small mucous patches were seen in the fauces. All had positive STS and all have been reversed by treatment. No cases of condylomata were seen.

A healed, or healing chancre, was found on the penis in the above 6 patients, and a scar on the shaft of the penis in the patient with interstitial keratitis.

(*d*) *Tertiary Lues (3 Cases)*

All 3 patients presented with gummata. In 2 a chronic weeping eczematous condition of the lower legs was associated with deep, punched-out ulcers on the lower and anterior aspect of the lower legs. The ulcers, in general, were about the size of a 10-cent piece. The eczematous condition had been present for a considerable period. One patient was found on a check examination after illness (bronchitis). The other sought treatment from the medical department after a period in hospital for eczema had brought no appreciable improvement. Both were Coloured patients and both gave unsatisfactory histories concerning the possibility of venereal disease.

The remaining patient presented with a small, deep ulcer below the left lateral malleolus of the ankle, and was found at the initial medical examination for new intakes. This was an Asiatic with no history of venereal disease. The ulcer was indolent and had healed and broken down several times in the previous 3 years.

In all 3 patients a positive serology was obtained, which was reversed after a varying number of courses of penicillin. Healing of the ulcers and the associated eczematous conditions was most satisfactory, but the scar formation appears to be thin and requires protection from friction.

The patients with secondary and tertiary lues, all with positive serology, are not included in the section of those with positive STS.

(*e*) *Urethritis (Probably Gonococcal) (56 Cases)*

Staining materials were not available during this survey, and Burke[4] expresses the opinion that gonorrhoea can only be diagnosed when the typical Gram-negative diplococci are seen in the apparently intracellular position. For that reason a diagnosis of 'urethritis' was made in the above patients, but the probability on clinical grounds was that they had true gonorrhoea.

All had a history compatible with exposure to the gonococcus, and the incubation period varied between 3 and 7 days. In each case there was a heavy purulent discharge from the urethra accompanied by a feeling of discomfort in the penis and a varying degree of dysuria. There appeared to be no delay in reporting symptoms, and it now seems commonly known in this area that gonorrhoea generally responds promptly to treatment. This is a noticeable contrast to earlier experience in the army and rural practice in this country.

It has now become a routine procedure to submit a blood sample for serological investigation in all cases of venereal disease, but this was unfortunately not done from the commencement of the study. Submission of blood samples is not always easy, and it has been noticed that men suffering from urethritis are often very unwilling, and on occasion flatly refuse, to have blood taken. In all, 26 samples were submitted from this group; 20 were negative, but 6 had positive STS and were treated accordingly.

Treatment for the patients with urethritis consisted of 4 daily injections of penicillin (1,200,000 units). No cases of penicillin resistance were encountered, and on clinical grounds cure was established in all cases. A follow-up study is proceeding, however. Urethritis is recognized as a difficult problem to control. Many men, separated from their families, have formed local liaisons. It is extremely likely that owing to the highly infective nature of gonorrhoea and its short incubation period,[5] infection is conveyed to their wives when they return home, as many do at weekends.

(*f*) *Urethritis with Epididymitis (7 Cases)*

Apart from the 56 patients with frank anterior urethritis mentioned previously, 7 presented with an acute epididymitis. In all 7 the epididymis was uniformly swollen and tender, with maximum tenderness located in the globus minor. Milking the anterior urethra resulted in the expression of a purulent discharge, and a history of exposure to venereal disease was obtained in all cases.

Treatment consisted of daily penicillin injections (600,000 units) plus sulphathiazole, 4 G. per day, for 5 days. The results were all satisfactory, and no relapses have been recorded. In 3 patients the prostate was tender, and prostatic massages were done twice a week for 6 weeks.

(*g*) *Lymphogranuloma Inguinale (5 Cases)*

This disease should be diagnosed only when the aetiological agent, *Donovania granulomatis*, can be found in slides, or where the characteristic cell can be demonstrated. The cell is relatively large (25 – 90μ) and contains intracytoplasmic cysts filled with the deeply stained Donovan bodies.[2] In this study the diagnosis was perforce made only on clinical grounds, and the possibility that some of the inguinal buboes seen were due to chancroid is admitted.

In general, however, the inguinal adenitis — unilateral in this series — was relatively painless, hard and indurated. In 2 cases fluctuation occurred, and when incised, sero-purulent material was found. Healing occurred rapidly after incision. All patients presented with an inguinal bubo. The serological investigation was negative for syphilis, and in no case were there ulcers to be found on the penis.

Treatment consisted of streptomycin, 1 G. daily, and a response was obtained within 10 days. It was not found necessary to give chloramphenicol or a tetracycline.

(*h*) *Chancroid (Soft Sores) (4 Cases)*

All 4 patients presented with multiple, small, painful ulcers on the glans. In no case did the ulcers become phagedenic or serpiginous in type. The incubation period in each case appeared to be short, 2 - 5 days, and this was regarded as a significant diagnostic point.[2]

Treatment consisted of sulphathiazole, 4 G. daily, for 5 to 10 days. In addition penicillin (600,000 units) was given daily for 5 days. The ulcers all healed, and no cases developed inguinal buboes.

(*i*) *Combined Infections (3 Cases)*

One patient with a primary chancre and urethritis was seen. In 2 others soft sores were associated with a purulent urethritis. All patients were given penicillin intramuscularly — the latter 2 received sulphathiazole in addition. Response to treatment in all 3 was satisfactory.

(*j*) *Probable Venereal Infections (8 Cases)*

Two patients presented with a subacute epididymo-orchitis without evidence of urethritis or prostatitis. Penicillin intramuscularly (600,000 units) daily for 5 days resulted in resolution of the tender swellings of the epididymis and testis in each case.

Six patients presented with watery urethral discharge and dysuria as the main symptoms. There was no admitted history of venereal exposure. Pruritus about the urethra was a common complaint. An interesting fact was that dysuria was a prominent feature, and, as a rule, in cases of nonspecific urethritis, dysuria is uncommon.[2]

Treatment again consisted of 600,000 units of penicillin daily intramuscularly. All the patients responded dramatically, which

again is unusual for patients with nonspecific urethritis. For these reasons the conditions have been classified as probable venereal infections — possibly of gonococcal origin.

Comparative Incidence Figures

In 1951 Lamont,[6] working at this factory, found 15·58% positive STS in 199 cases. In 1957 I made a detailed socio-medical study of 308 African men working at SARMCOL; 25 men had positive STS when blood samples were submitted, i.e. 8·1%. The present survey showed that 130 men out of 949 examined had positive STS, i.e. 13·7%. Of the 151 men in this study with positive STS, 136 (90%) were Africans, 11 (7·3%) were Asiatics and 4 (2·7%) were Coloured.

Racial Incidence

In the total of 259 patients with venereal disease discussed, 233 (89·9%) were Africans, 15 (5·8%) were Asiatics and 11 (4·2%) were Coloured. An average figure for each group employed was calculated as from January 1961. The average figure for Africans employed is 1,353. The average figure for Asiatics employed is 310. The average figure for Coloureds employed is 51.

The apparent racial incidence of venereal disease in this Company based on this study is therefore: African 17·2% (i.e. 233 cases out of 1,353 employed), Asiatic 4·8% (i.e. 15 cases out of 310 employed), and Coloured 21·6% (i.e. 11 out of 51 employed).

Relative Frequency of Venereal Disease

Since 1 October 1961 I have been in full-time employment at SARMCOL. Excluding those with positive STS, 108 patients with venereal disease have been seen in the period 1 October 1961 - 18 February 1963. This represents 65 weeks of work, or an average of 1·6 cases of venereal disease seen per week. In the same period, 2,409 patients with all other types of illness (excluding IOD) were seen in non-Europeans. The ratio of venereal disease to all other illnesses, therefore, is 1 : 22·3.

Reactions to Penicillin

In 8 out of the 259 patients in this series penicillin injections were discontinued. All 8 fell into the group with positive STS.

In 3 patients the injections were said to cause lassitude, sleepiness and general malaise. It is probable that the men concerned were trying to evade the discomfort of injections, but fearing a dramatic sensitivity reaction the penicillin was withdrawn and replaced by diethylamine acetarsol (Acetylarsan), 3 ml. intramuscularly once a week. These are not regarded as true penicillin reactions.

Local Reactions

In 2 patients itching and induration occurred at the site of the injection. The reaction in each case was seen the day after treatment, and had developed some hours after the injection. Each patient was treated by diphenhydramine hydrochloride B.P. ('benadryl'), 10 mg. subcutaneously *b.d.* Response to treatment was prompt.

Generalized Reactions

In 3 patients a generalized erythema multiforme-like rash covering the face, trunk, arms, hands, legs and feet occurred.

In 2 of the above patients the rash was accompanied by marked pruritus, stuffiness of the nose, and swelling of the eyelids, and occurred after the first injection of penicillin. In one patient this happened within half an hour of the injection. In the other the reaction developed more slowly, but all the symptoms were present 2 hours after the injection. The third patient was seen the day after the injection. The erythema multiforme-like rash appeared during the night, and he was on his third course of penicillin.

Two of the 3 patients were treated with benadryl, 20 mg., subcutaneously, *b.d.* for 2 days, and responded satisfactorily. The remaining patient was seen by a colleague who practises in the township.

The 2 patients with local reactions and the 3 with generalized symptoms were thought to have true penicillin reactions. There were thus 5 out of 254 (the 5 patients with lymphogranuloma inguinale received streptomycin) patients under treatment who showed penicillin reactions (1·9%). Benadryl, 20 mg., is added to each 10 ml. vial of penicillin. Each ml. of 300,000 units of penicillin has therefore 2 mg. of benadryl added. It is not possible in a small series of this sort to say with certainty how effective this is in preventing penicillin reactions, or minimizing those that occur, but my impression is that it is of value.

Comparative Absence Figure

From 1 October 1961 to 31 December 1962 a total of 6,146 certificates of illness were submitted by non-Europeans to cover absence from work. Of these, 297 certificates were for genito-urinary conditions. It is probable that the majority of cases of absence owing to venereal disease fell into this group. It was not possible, however, to provide accurate statistical evidence, from the certificates presented, of the true incidence of venereal disease as a cause of absence from work.

The 259 patients with venereal disease discussed were all treated at work. Where facilities exist for the full treatment of venereal disease (as they do at SARMCOL) it is probable that venereal disease is not a major cause of lost time owing to sickness.

SUMMARY

259 cases of venereal disease occurring in non-European industrial workers are discussed. The value of routine blood tests for all new intakes is well shown by the fact that 130 positive and doubtful reactions were found out of 949 samples submitted, i.e. 13·7%. Twenty-one cases with positive STS (serological tests for syphilis) were found before routine submission of blood tests was undertaken. In addition 108 cases of venereal disease were found at routine medical clinics in a period of 65 weeks.

The 108 cases comprised 56 of anterior urethritis, 7 of urethritis with epididymitis, 15 of primary lues, 7 of secondary lues, 3 of tertiary lues (all with gummata), 5 with lymphogranuloma inguinale, 4 with chancroid, and 3 with combined infections. The diagnoses were made on clinical grounds. The ratio of venereal disease to all other illness in this study was 1 : 22·3.

The majority of the patients were treated with penicillin. To each ml. (300,000 units) of penicillin 2 mg. of diphenhydramine hydrochloride B.P. (benadryl) were added. There were 5 cases of penicillin sensitivity out of 254 cases treated, i.e. 1·9%.

Follow-up studies based on blood tests and clinical observation suggest that the response to treatment was satisfactory. In this area at least, venereal disease constitutes a problem in industrial health which requires active measures of treatment.

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