Therapeutic algorithms for the management of sexually transmitted diseases at the peripheral level in Côte d'Ivoire: assessment of efficacy and cost

G. La Ruche,[1] F. Lorougnon,[2] & N. Digbeu[3]

In the acquired immunodeficiency syndrome (AIDS) era, adequate management of sexually transmitted diseases (STDs) is a primary concern in Africa. Assessed in this study is the clinical efficacy and feasibility of WHO-recommended therapeutic algorithms for genital discharges and ulcers, diagnosed without laboratory tests, for use at the primary health care level. Drugs were sold on a cost-recovery basis and included intramuscular ceftriaxone and oral ciprofloxacin for single-dose therapy of gonorrhoea and chancroid.

During April 1993 in 10 peripheral health care centres in Abidjan, Côte d'Ivoire, a total of 207 patients were followed up, including 89 cases of male urethritis, 92 cases of vaginal discharges and 26 cases of genital ulcers; clinical success, assessed 7 days after the onset of therapy, was, respectively, 92%, 87%, and 100%. Less than 10% of the 207 patients were referred to the next care level, an acceptable rate from a public health point of view. Medical adherence to the algorithms was excellent for urethral discharges and genital ulcers but poor for vaginal discharges, partly because of intentional therapeutic modifications, without detriment to success. For drugs, the average cost per cure was 1546 francs CFA (US$ 5.60) (maximum, 2980 francs CFA (US$ 10.70)). Effective and affordable treatments for STDs are necessary for their realistic case management in Africa.

Introduction

The control of sexually transmitted diseases (STDs) is of major importance in Africa particularly since the emergence of the acquired immunodeficiency syndrome (AIDS). Since it affects the productive population, STD-linked morbidity is responsible for economic loss in the community (1). Delays in diagnosing and treating such infections with antibiotics explain the frequent complications and sequelae. Such complications affect chiefly women (pelvic inflammatory disease, postpartum infections, ectopic pregnancy, infertility, and chronic pelvic pain); however, men are also affected (urethral stricture and epididymitis), as are infants (neonatal conjunctivitis and respiratory disease). *Neisseria gonorrhoeae* and *Chlamydia trachomatis* are the principal bacteria responsible (2) and must be the primary target of STD control programmes in sub-Saharan Africa. Evidence has emerged that ulcerative or inflammatory STDs enhance transmission and acquisition of human immunodeficiency virus (HIV) (3). Appropriate management of STDs aims to minimize their complications and reduce the incidence of HIV.

The emergence of strains that are resistant to cheap antibiotics poses a problem for the treatment of gonorrhoea, the principal cause of male urethritis, and for chancroid, the commonest genital ulcer in Africa. An effort must be made to obtain effective drugs to these STDs, preferably in single-dose regimens. Finally, the drugs must be affordable for patients in developing countries; fluoroquinolones and some third-generation cephalosporins could meet these requirements. Adoption of standardized therapeutic strategies, adapted to local situations, will make the management of STD patients and their sex

[1] Technical Adviser, Programme National de Lutte contre le SIDA/MST de Côte d'Ivoire, Abidjan, Côte d'Ivoire; and Coopération Française, Projet-Santé-Abidjan. Requests for reprints should be sent to Dr La Ruche at the following address: Bureau Central de Coordination de la Lutte contre le SIDA/MST, 04B.P. 2113 Abidjan 04, Côte d'Ivoire.

[2] Chief, STD Programme, Programme National de Lutte contre le SIDA/MST de Côte d'Ivoire, Abidjan, Côte d'Ivoire.

[3] Assistant, Programme National de Lutte contre le SIDA/MST de Côte d'Ivoire, Abidjan, Côte d'Ivoire.

partners easier and more effective. Such STD treatment guidelines must be applicable at the primary health care level (4), i.e., they do not require microbiological investigation.

The aims of the study were to assess the clinical efficacy and the feasibility, including cost, of therapeutic algorithms for the management of genital ulcers and discharges in men and women, within the peripheral health care centres, in Abidjan, Côte d'Ivoire, in the absence of laboratory tests.

Materials and methods

Recruitment of patients and follow-up

Consecutive patients presenting at ten peripheral health care centres in five of the ten districts of Abidjan, the principal city of Côte d'Ivoire, were eligible for enrolment in the study. The patients (males or females aged >12 years) presented either genital ulcers or discharges, and gave their verbal consent for inclusion in the study. Health care centres were selected in order to ensure varied recruitment in the public sector. Included were three general medicine and three gynaecology clinics at the community level, two military health establishments, and two school health services.

Within each centre, one clinician (a physician in 9 instances and a male nurse in one instance) was trained for the study. The clinician recorded anamnestic and clinical data for each participant on a standardized form, then applied the therapeutic algorithm (decision-tree) corresponding to the patient's condition. Drug distribution took place at the end of this first visit, either in the centre's pharmacy, if it existed, or directly by the clinician in school and military centres. Drugs were sold systematically to the patients on a cost-recovery basis. Patients who could not pay or who refused to do so were excluded from the study. In addition to drugs, patients received advice on STD prevention and on partner notification; they were also given free condoms. Approximately 100 patients of each sex were recruited.

Patients were re-examined 7 days after they had been recruited to permit assessment of the clinical efficacy of the treatment. Treatment success was defined as the disappearance of genital discharges or the marked improvement of genital ulcers, i.e., the ulcer was in the process of healing. In the event of failure, the patient was referred to the next health care level and left the study.

STD therapeutic algorithms

Four syndrome-based decision-trees were evaluated, following the consensus statement and guidelines

prepared by WHO and the Centers for Disease Control (CDC) (5, 6).[a] The algorithms used are outlined below and shown schematically in Fig. 1.

Male urethral discharge (UD) (Fig.1a) was treated with a single intramuscular injection of 250 mg ceftriaxone or with a single oral dose of 500 mg ciprofloxacin, targeting gonorrhoea, combined with 200 mg doxycycline once daily for 7 days, targeting chlamydial infection. This algorithm was applicable when patients complained of UD, dysuria, or frequency of urination without objective signs of UD.

Vaginal discharge (VD) with speculum examination (SpE) (Fig. 1b) was treated as a UD if the secretion was from the endocervix, but otherwise was treated with nystatin (vaginal tablets, 100 000 units) intravaginally for 14 days, targeting candidiasis, combined with a single dose of 2 g tinidazole if the discharge was malodorous, targeting trichomoniasis and bacterial vaginosis.

For VD without SpE (Fig. 1c) both modes of treatment used for VD with SpE were systematically combined; clinicians were not urged to use the speculum.

Genital ulcers (GU) (Fig. 1d) were treated with either a single intramuscular injection of 250 mg ceftriaxone or a single oral dose of ciprofloxacin, targeting chancroid, combined with a single intramuscular injection of 2.4 million units of benzathine benzylpenicillin G, targeting primary syphilis. In the presence of vesicular or recurrent lesions, simple disinfection of herpetic lesions was advised.
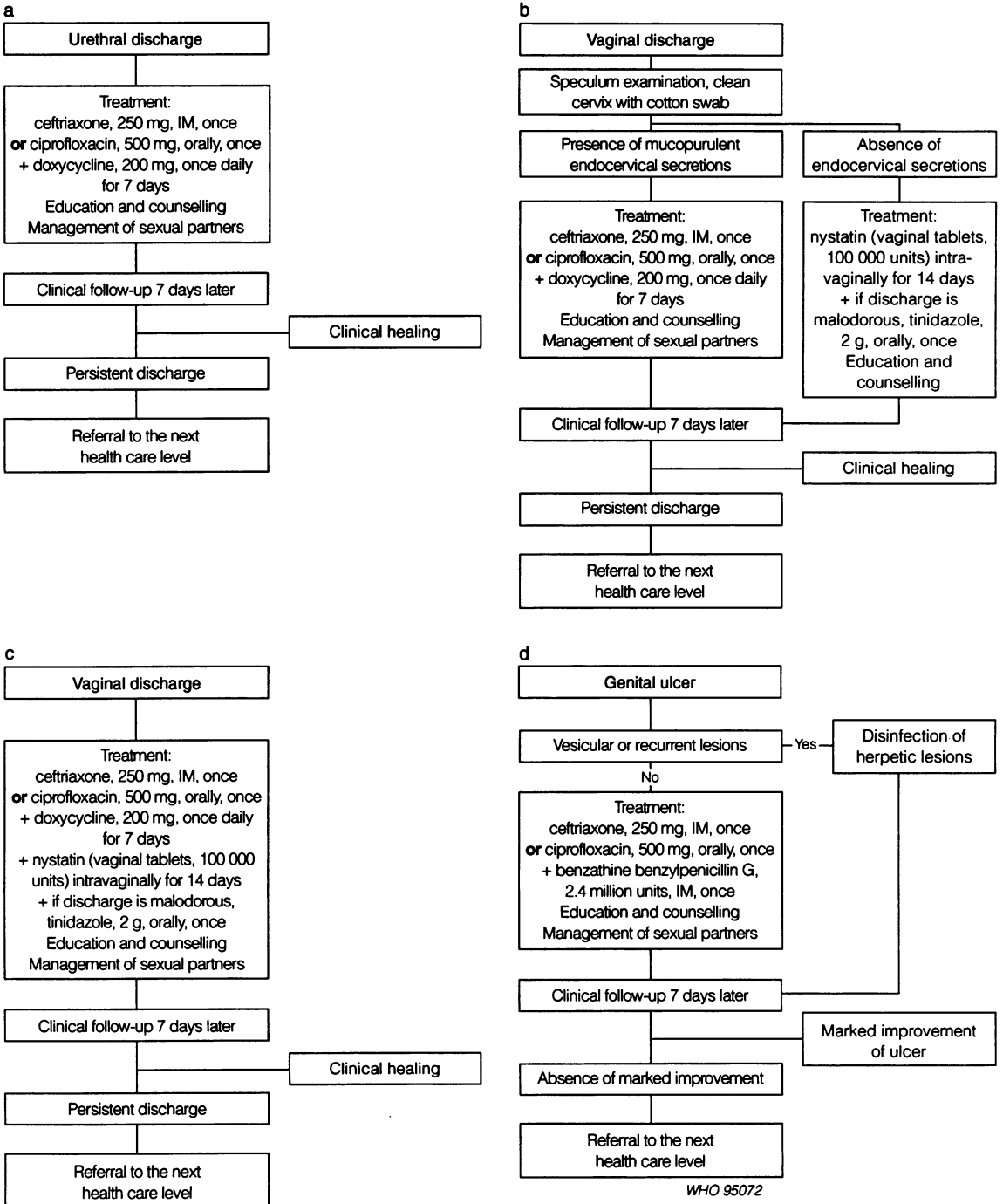
Ciprofloxacin was distributed to five of the clinicians and ceftriaxone to the other five; the distribution was random. Instead of contraindicated ciprofloxacin, pregnant women received ceftriaxone and oral erythromycin (1 g twice daily for 7 days) instead of doxycycline.

Theoretical cost of the therapeutic algorithms

Four of the drugs used are included in the Côte d'Ivoire essential drugs list (doxycycline, erythromycin, nystatin, and benzathine benzylpenicillin G). For the study, they were sold at an amount specified by the government. The price charged for the three other drugs (ciprofloxacin, ceftriaxone and tinidazole) was designed to simulate their integration into the essential drugs list, and was based on information gathered from pharmaceutical companies. The theoretical costs to treat a case of STD were as fol-

Fig. 1. **Therapeutic algorithms for the management of sexually transmitted diseases: (a) male urethral discharge; (b) vaginal discharge with speculum examination, (c) vaginal discharge without speculum examination; and (d) genital ulcer.**

a

Urethral discharge

Treatment:
ceftriaxone, 250 mg, IM, once
or ciprofloxacin, 500 mg, orally, once
+ doxycycline, 200 mg, once daily
for 7 days
Education and counselling
Management of sexual partners

Clinical follow-up 7 days later

Clinical healing

Persistent discharge

Referral to the next
health care level

b

Vaginal discharge

Speculum examination, clean
cervix with cotton swab

Presence of mucopurulent endocervical secretions

Absence of endocervical secretions

Treatment:
ceftriaxone, 250 mg, IM, once
or ciprofloxacin, 500 mg, orally, once
+ doxycycline, 200 mg, once daily
for 7 days
Education and counselling
Management of sexual partners

Treatment:
nystatin (vaginal tablets,
100 000 units) intra-
vaginally for 14 days
+ if discharge is
malodorous, tinidazole,
2 g, orally, once
Education and
counselling

Clinical follow-up 7 days later

Clinical healing

Persistent discharge

Referral to the next
health care level

c

Vaginal discharge

Treatment:
ceftriaxone, 250 mg, IM, once
or ciprofloxacin, 500 mg, orally, once
+ doxycycline, 200 mg, once daily
for 7 days
+ nystatin (vaginal tablets, 100 000
units) intravaginally for 14 days
+ if discharge is malodorous,
tinidazole, 2 g, orally, once
Education and counselling
Management of sexual partners

Clinical follow-up 7 days later

Clinical healing

Persistent discharge

Referral to the next
health care level

d

Genital ulcer

Vesicular or recurrent lesions — Yes —

Disinfection of herpetic lesions

No

Treatment:
ceftriaxone, 250 mg, IM, once
or ciprofloxacin, 500 mg, orally, once
+ benzathine benzylpenicillin G,
2.4 million units, IM, once
Education and counselling
Management of sexual partners

Clinical follow-up 7 days later

Marked improvement of ulcer

Absence of marked improvement

Referral to the next
health care level

WHO 95072

lows: 1370 francs CFA (US$ 4.90) for UD; 1240 francs CFA (US$ 4.50) for GU; and 490–2160 francs CFA (US$ 1.80–7.80) for VD, depending on whether or not a speculum was used and on the presence of a malodorous discharge.[b] The treatment of pregnant women was more expensive (up to 2960 francs CFA (US$ 10.70)) because erythromycin is more expensive than doxycycline. Disinfectants were not included in the treatment cost. The cost of the consultation was the normal amount charged in the public sector. At the time of the study, military, school, and general medicine consultations were free, whereas patients paid for consultations with a gynaecologist.

Statistical analysis

Data were analysed using epidemiological and statistical software (Epi-Info, Epitable, Egret). Variables associated with therapeutic success were determined by univariate analysis, using Fisher's exact test or χ^2 test, as appropriate, with confidence limits for odds ratios calculated using Taylor's semi-exact method, and subsequently assessed in a multivariate analysis using logistic regression. Means were compared using analysis of variance or Kruskall–Wallis's test, as appropriate.

Results

Study population

A total of 340 ambulatory patients with STD were observed in the 10 peripheral health care centres during April 1993 over a 120-day period. Of these patients, 104 (30%) were not included, 62 of them (18%) for financial reasons. Other grounds for noninclusion were as follows: management of the patient by a noninformed clinician (13 cases); distant residence, making follow-up impossible (10 cases); lack of drugs (9 cases); need to receive other drugs (5 cases); and the refusal of the patient to participate (5 cases). Only one patient refused to participate in the study because he insisted on receiving an injection instead of oral treatment. There was no sexual or genital-syndrome bias between the included and nonincluded patients. A total of 236 consecutive patients were enrolled, of whom 29 (12%) were lost during follow-up. Also, there was no sexual or genital-syndrome or clinical-feature bias between patients who were followed up and those who were not. The analysis focused on the 207 complete files of 100 females and 107 males. Table 1 shows the demographic characteristics and disease history of the study population, by sex. The mean age of the population was 27.8 years (SD, ± 7.8 years; range, 16–58

years); 77% of patients were aged 20–39 years. Of the 207 patients who were followed up, 181 (87.4%) had genital discharge (89 UD and 92 VD) and 26 (12.6%) had GU (18 men and 8 women). A total of 5 women who exhibited both a VD and a GU at the time of examination were treated for both conditions but their data were analysed within the GU group. A total of 35% (73/207) presented symptoms that suggested that they had experienced STDs during the preceding 12 months, and 30% (62/207) were already receiving antibiotics for their current STD episode. The onset of the symptoms leading to inclusion in this study was specified in 192 cases. The delay before presenting was 32 days on average (SD, ± 45 days; range, 0–242 days). Almost half the patients (46%) presented for consultation later than one week after the onset of their illness. The mean delay was longer for VD (51 days) than for UD (18 days) or GU (21 days) (P <0.001). A total of 16% (34/207) reported that their sexual partners had STD symptoms. The partners were not included in the study, but 25% (51/207) of partners were treated by the study physicians.

Clinical features at the time of enrolment

Among patients treated for UD, 10% (9/89) did not present any discharge; urinary symptoms accounted for the inclusion of seven, while two patients had urethral smarting. These last two patients were wrongly enrolled but their data were used in the analysis. At the time of examination, discharge was noted clinically in 80% (64/80) of cases, and assessed through interview in other cases. The occurrence of discharge was independent of previous antimicrobial chemotherapy. Discharge was more often present when the delay before presenting was short: 93% for a week or less versus 69% for later (P = 0.008). The discharge was purulent in 57.5% (46/80) of cases, cloudy in 20% (16/80), and clear in 22.5% (18/80). Of the 89 patients, 80 (90%) presented at least one urinary symptom ("burning" urine, 83% of patients; frequency of urination, 67%; dysuria, 49%). A total of 76% (68/89) complained of urethral pruritus or discomfort and 33% (29/89), of pelvic pain.

Among patients treated for VD, 2% (2/92) did not present any discharge, and had therefore been wrongly enrolled. Discharges were malodorous in 70% (63/90) of cases, often milky (79%) and yellow (65%), frothy in 36% of cases, and green in 13%. Associated signs were vaginal pruritus in 70%, pelvic pain in 50% and urinary symptoms in 53% of cases ("burning" urine, 45%; frequency of urination, 42%; and dysuria, 33%). Of the 92 patients, 38 (41%) were pregnant, as follows: first trimester for four, second trimester for 16, third trimester for 13, and unknown duration for the remaining five cases.

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[b] Costs are expressed in francs CFA before the recent devaluation.

Table 1: **Demographic characteristics, disease history, and types of sexually transmitted diseases (STDs) among the study population, by sex, Abidjan, April 1993**

Variable	Males (n = 107)	Females (n = 100)	P-value[a]
Mean age ± SD (years)	29 ± 8	27 ± 7	NS
Previous STDs in the past 12 months (%)	26	45	0.005
Antibiotic still being received for current STD (%)	43	16	<0.001
Mean delay before presenting ± SD (days)	18 ± 25	48 ± 56	<0.001
STD symptoms in sexual partner (%)	12	21	NS
Sexual partner managed by the clinician (%)	14	36	<0.001
No. with discharges/No. with ulcers (ratio)	89/18 (4.9)	92/8 (11.5)	0.06

[a] Percentage comparisons were calculated using the χ^2 test and mean comparisons, using the Kruskall–Wallis's test; NS = not significant.

Bimanual examination was performed on 85% of the 92 patients; 46% were sensitive to cervical touch and 31% had adnexal sensitivity. SpE was carried out on 55% (51/92) of cases; 37% (19/51) had vaginal inflammation, 14% (7/51) had secretion from the endocervix, while 25% (13/51) had both signs. Additionally, 22% (11/51) presented induced endocervical bleeding; of these, 10 (including 9 pregnant women) exhibited an erosive and inflammatory cervix.

Of the 26 patients with GU, 16 (62%) were painful and 22 (85%) were clean — 50% (13/26) were multiple, irrespective of the duration of the episode. Ulcers persisted for more than a week in 81% (17/26) of cases. Of the eight women with ulceration, seven were vulvar and one cervical, and among the 18 men with ulcers, 13 were located on the glans, three on the corona, and two on the scrotum. Inguinal lymph nodes were involved exclusively in 41% (7/17) of male cases. Most cases of GU were considered clinically to be chancroid.

Adherence to algorithms by clinicians

The therapeutic algorithms were followed scrupulously by the 10 clinicians in 76% (158/207) of cases; adherence was essentially connected to the genital syndrome. Clinicians abided by the protocol in 98% (87/89) of cases of UD (2 patients received an additional drug) and in 100% of the 26 cases of GU. On the other hand, the algorithms for VD with or without SpE were poorly observed; for 53% (27/51) of cases with SpE and for 44% (18/41) of cases without. Treatment was sufficient (correct or excessive) for 94% (48/51) of cases with SpE, but for 34% (14/41) of cases without SpE the treatment was inadequate (at least one drug missing). The difference was highly significant ($P < 0.001$). Of the 47 deviations from the algorithms for VD, 26 were deliberate and depended on patient clinical features, whereas 21 were made mistakenly or because of lack of understanding of the decision-tree algorithms. All the patients complied with the treatment.

Efficacy of the algorithms

Overall, clinical success was 90.8% (188/207), broken down as follows: 92.1% (82/89) of the UD cases (95% confidence interval (CI) = 86.5–97.7%) and 100% of the GU cases (complete cure for 16 of 26 cases, and ulcer healing over for 10 cases). Healing occurred in 87.0% (80/92) of the VD cases (95% CI = 80.1–93.8%), with no difference between the algorithms for those with or without SpE, (86.3% (44/51) and 87.8% (36/41), resp.). Of the 19 failures (7 men and 12 women), improvement occurred in four men and nine women.

For the UD algorithm, univariate analysis indicated that the following clinical factors were associated with therapeutic success (Table 2): occurrence of discharge; purulent or cloudy discharge; presence of at least one urinary symptom; delay before presenting <1 week; and correct adherence to the algorithm. Other variables were not linked to succes; for example, the presence of discharge at the time of examination or receiving treatment with antibiotics for the current STD. Finally, therapeutic success did not differ between patients receiving ceftriaxone or ciprofloxacin (96.2% (50/52) and 86.5% (32/37), resp.). Multivariate analysis indicated that the following were independent predictors for success: the occurrence of a discharge; and the presence of at least one urinary symptom (in both cases, $P = 0.024$; odds ratio (OR) = 8.5; 95% CI = 1.3–54).

For the VD algorithms, univariate analysis indicated that the following clinical factors were associated with success: a yellow discharge ($P = 0.021$; OR = 4.7; 95% CI = 1.1–21); and pregnancy ($P = 0.014$; OR = 9.5; 95% CI = 1.2–2.09). These factors were not independent in so far as pregnant women more frequently presented a yellow discharge (84% versus 52% for those not pregnant; $P = 0.002$). Of the 92 patients treated for VD, 34 received ceftriaxone and 30, ciprofloxacin, with the success rate being similar for both groups (85.3% (29/34) and 83.3% (25/30), resp.). Furthermore, success did not depend

Table 2: **Relationship of disease history, symptoms, and signs to clinical therapeutic success for cases of male urethral discharge, Abidjan, April 1993 (n = 89)**

| | Factor: | | | |
| | Present: | Absent: | | |
Variable	No. successes/ No. present	No. successes/ No. absent	Odds ratio	P-value[a]
Previous STDs in the past 12 months	20/21 (95)[b]	62/68 (91)	1.9; *0.2–17.1*[c]	NS
Antibiotic being received for current STD	33/37 (89)	49/52 (94)	0.5; *0.1–2.4*	NS
STD symptoms in sexual partner	11/12 (92)	71/77 (92)	0.9; *0.1–8.5*	NS
Delay before consulting <1 week	44/45 (98)	35/41 (85)	7.5; *0.9–65.6*	0.05
Presence of urinary symptom[d]	76/80 (95)	6/9 (67)	9.5; *1.7–52.6*	0.03
Existence of discharge[e]	76/80 (95)	6/9 (67)	9.5; *1.7–52.6*	0.03
Occurrence of the discharge	62/64 (97)	14/16 (88)	4.4; *0.6–34.2*	NS
Purulent or cloudy discharge	61/62 (98)	15/18 (83)	12.2; *1.2–125.7*	0.04
Correct indication for algorithm[f]	82/87 (94)	0/2 (0)	NA	<0.001

[a] Determined by univariate analysis using Fisher's exact test; NS = not significant.
[b] Figures in parentheses are the % cured.
[c] Figures in italics are the 95% confidence interval.
[d] Burning urine, frequency of urination or dysuria.
[e] Discharge noted clinically or assessed through interview.
[f] Algorithm was applicable when patients complained of urethral discharge (UD), dysuria or frequency of urination without objective signs of UD; NA = not applicable.

on whether or not the algorithms were followed (86.7% (39/45) and 87.2% (41/47), resp.). In particular, of the 47 departures from the protocol, all 26 that were deliberate were successful, versus 15 of the 21 that were made by mistake ($P = 0.005$). Among the 17 women who received insufficient therapy, no failure occurred for the 12 cases for whom there was deliberate departure from the protocol, but failure occurred in two of the five cases for whom it was as a result of error.

As far as GU was concerned, patients who received antibiotics before enrolment exhibited a lesser degree of healing than others (30% versus 81%; $P = 0.016$).

Tolerance of drugs

Side-effects were reported by 15% of patients (31/207), but had no influence on the therapeutic success. The side-effects were mild and transient. Two types of adverse effects were observed. Gas-

Table 3: **Cost of drugs and direct cost (drugs + consultations) for clinical management of patients with sexually transmitted diseases, Abidjan, April 1993 (n = 207)[a]**

| | Mean drug cost per cure ± SD (US$)[a] | | Mean direct cost per cure ± SD (US$)[a] | |
Algorithm	For all patients (n = 207)	Excluding deviations[b] (n = 158)	For all patients (n = 207)	Excluding deviations[b] (n = 158)
Urethral discharge	5.0 ± 0.2 (89)[c] *4.9–6.1*[d]	4.9 ± 0.1 (87) *4.9–5.0*	5.0 ± 0.2 (89) *4.9–6.1*	4.9 ± 0.1 (87) *4.9–5.0*
Vaginal discharge with SpE[e]	6.5 ± 3.2 (51)[c] *1.1–10.7*	5.9 ± 3.6 (27) *1.8–10.7*	8.4 ± 3.5 (51) *1.8–16.8*	7.7 ± 3.4 (27) *1.8–12.5*
Vaginal discharge without SpE[e]	6.4 ± 2.3 (41)[c] *2.8–10.7*	7.8 ± 0.8 (18) *6.6–10.7*	7.0 ± 1.9 (41) *4.6–12.5*	7.9 ± 1.2 (18) *6.6–10.7*
Genital ulcer	4.5 ± 1.3 (26)[c] *0–8.7*	4.5 ± 1.3 (26) *0–8.7*	4.9 ± 2.1 (26) *0–11.7*	4.9 ± 2.1 (26) *0–11.7*

[a] Based on a conversion rate 278 francs CFA = FF 5.56 = US$ 1.00.
[b] Excluding 49 patients receiving excessive or insufficient drug with respect to algorithms.
[c] Figures in parentheses are the number of patients.
[d] Figures in italics are the range.
[e] SpE = speculum examination.

trointestinal disorders (nausea, vomiting, abdominal pain, heartburn, or diarrhoea) were associated with use of doxycycline (13% (18/136) versus not taken, 1% (1/71); $P = 0.006$). Neurological troubles (dizziness, fatigue, headache, or somnolence) were associated with use of tinidazole (19% (15/77) versus not taken, 4% (5/130); $P < 0.001$).

Direct cost of clinical management of patients with STD

For drugs, the average cost per cure for the 207 patients was 1546 francs CFA (US$ 5.60 ± 2.10), ranging from no cost (a case of genital herpes) to 2980 francs CFA (US$ 10.7) (Table 3). On average, the 89 cases of UD cost 1380 francs CFA (US$ 5.00) per cure, and the 26 cases of GU, 1258 francs CFA (US$ 4.50) per cure. The average post per cure of a case of VD was 1788 francs CFA (US$ 6.40), irrespective of whether a speculum was used or not. For those cases for whom there was strict adherence to the algorithms, the average cost per cure for a case of VD was lower with SpE than without (1625 francs CFA (US$ 5.90) and 2153 francs CFA (US$ 7.80), resp.; $P = 0.03$)

A total of 78% of patients (161/207) had free consultations. No male patients paid for their consultations but 46 female patients out of 100 paid for theirs. Only specialized gynaecological consultations were not free, costing 1500–2000 francs CFA (US$ 5.40–7.20) but 500 francs CFA (US$ 1.80) for pregnant women. When the consultation price was taken into account (Table 3), the average direct cost (drugs + consultation) of the 207 cases of STD studied was 1721 francs CFA (US$ 6.20 ± 2.50 (range 0–4680 francs CFA (US$ 0 – 16.80)). The average direct cost per cure for a case of a VD was higher with a speculum than without, 2332 francs CFA (US$ 8.40) and 1933 francs CFA (US$ 7.00, resp.; $P = 0.01$). For the 158 cases for whom there was correct adherence to the treatment algorithms, the average cost per cure for a case of VD was 2158 francs CFA (US$ 7.80) irrespective of whether or not a speculum was used (Table 3).

Discussion

This study tested simple therapeutic algorithms for the management of the commonest STD syndromes. Clinical efficacy was satisfactory in so far as less than 10% of the 207 patients resorted to the next health care level, and thus to laboratory tests. This outcome is acceptable from a public health point of view. The results could be considered to be subjective since no microbiological investigations were performed. However, the findings should be viewed

in the context of primary health care from the point of view of feasibility. The study did not enable us to determine the reason for failure among patients treated for genital discharge, since management of these patients was too scattered and disparate; among the possible reasons for these failures are reinfection, non-compliance, and ineffectiveness of the medication. No information was available on reinfection. Subsequent interviews indicated appropriate levels of compliance. In the case of ineffectiveness, the targeted germ might have been resistant or unusual (e.g., trichomonal male urethritis) making the treatment inappropriate, or drug bioavailability could have been responsible (e.g., poor digestive absorption of oral drug). Also, the 7-day period used to check clinical efficacy may have been insufficient to determine whether cases with improved discharges had been treated successfully. The recommended length of therapy for chlamydial infection is 7–21 days, but a minimum of 15 days has been proposed especially for women. However, various studies have shown the effectiveness of 7-day regimens of tetracyclines or erythromycin to treat uncomplicated chlamydial infections in both sexes (7); a 7-day regimen is recommended by WHO and the CDC (5, 6).[c]

For male urethritis, therapeutic success was clear (92%) and all the more obvious since the clinical situation was marked: presence of a discharge that was purulent or cloudy, urinary symptoms and early presentation. The clinical efficacy of this algorithm justifies its promotion to all clinicians at the primary health care level in Côte d'Ivoire, accompanied by the training of health care workers to help them abide by the indications of the algorithm. Furthermore, health care workers must become more sensitive to the adequate management of STD patients. Certain aspects of this are sometimes neglected, including rigorous clinical examination of patients, advice on STD and HIV prevention through behavioural change and condom use, and treatment of a patient's sexual partner(s).

The therapeutic success for VD was slightly less favourable (87%), and no factor was linked to its success, except pregnancy. The low specificity of clinical manifestations of STD in women is a particular problem (4). Additional studies using laboratory tests are needed to identify the factors associated with pathological discharges, and thus adapt the treatment algorithms (8). However, the case management of women with STD symptoms needs to be distinguished from screening women for genital infections (i.e., active case finding). For the former, WHO-recommended clinical algorithms are probably

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[c] See footnote a, p. 306.

suitable as our findings illustrate; for the latter, simple hierarchical algorithms appeared not to be appropriate (9). In our study, adherence to the algorithms for VD was poor (<50%), irrespective of whether or not a speculum examination was carried out. Deliberate modifications of the algorithms were made, mainly by gynaecologists; such changes, however, did not affect their validity, because they were justified by the patient's symptoms. Such modifications, without detriment to success, can be expected if specialists use the algorithms, but far fewer are expected to be made by health care workers at the peripheral level. On the other hand, our study showed that mistakes in prescription can have unfortunate effects on success; they could be reduced by improving the presentation of the decision-trees, training the users, and by simplifying the algorithms. Speculum examination often reduced the cost of treatment, and in any case allowed a more precise diagnosis, thus saving drugs. Finally, the study identified that women with STD symptoms usually delay for a lengthy period before presenting; this highlights negligence and ignorance, and illustrates the underemployment of medical services by women.

The complete therapeutic success of the algorithm for genital ulcers justifies its use without modification. However, attention must be paid to the risk of increased failure with single-dose regimens for chancroid associated with HIV infection (10, 11). This is particularly worrying in Abidjan, where the HIV infection rate among men with genital ulcers attending STD clinics reached 46% (76/166) as early as 1990 (12). The absence of therapeutic failure in our study is reassuring, although relapses were not investigated.

For each of the algorithms, therapeutic success did not differ according to whether ciprofloxacin or ceftriaxone was used. Both drugs have advantages and disadvantages: ciprofloxacin (or an equivalent fluoroquinolone) is administered orally but is contra-indicated for pregnant women; ceftriaxone is suitable for pregnant women but is an injectable. Both drugs are well tolerated in a single-dose regimen and are efficient in treating gonorrhoea and chancroid (13, 14). One of these drugs should be added urgently to the essential drugs list in Côte d'Ivoire to improve the management of STD. Contrary to expectations, there was not a significant rejection of the oral regimen by patients. We therefore suggest that the oral single-dose therapy be adopted in most cases, reserving the injectable treatment for pregnant women.

A further criterion for selecting a drug is its cost. Efficient management of patients with STD implies that drugs are available within health care centres at an acceptable cost. The price of drugs is the main part of the cost of STD management, and

sometimes represents the entire cost. Thus, drugs must be affordable for most patients; this is of particular importance for the treatment of a patient's sexual partner(s), who are often asymptomatic and therefore not very prone to spend money on treatment. In Abidjan, the current cost of an efficient STD treatment is 7000–10 000 francs CFA (US$ 25–36) at a pharmacy. This high price justifies close collaboration between national STD programmes and essential drugs programmes, as illustrated by the fivefold reduction in costs in the present study. Such coordination is necessary to ascertain that recommended drugs are affordable and available. Although the costs involved in the treatment algorithms were much lower than those associated with treatment in private practices, for a notable proportion of patients the prices were still too high. In addition, the recent devaluation of the CFA franc will increase drug prices in this part of Africa and make the situation worse. Such considerations might bring the health authorities to consider free care for the poorest STD patients.

Acknowledgements

Résumé

Schémas thérapeutiques de prise en charge des maladies sexuellement transmissibles au niveau périphérique en Côte d'Ivoire: évaluation de l'efficacité et du coût

La lutte contre les maladies sexuellement transmissibles (MST) revêt en Afrique une importance essentielle à l'ère du Sida. Touchant une population active, la morbidité due aux MST grève l'économie de la collectivité. La prise en charge adéquate des MST vise à limiter leurs complications et à réduire l'incidence de l'infection par le VIH. L'adoption de stratégies thérapeutiques standardisées va faciliter la prise en charge des patients souffrant de MST et de leurs partenaires sexuels. Le but de cette étude était d'évaluer l'efficacité clinique et la faisabilité de schémas thérapeutiques des ulcérations et des écoulements génitaux en l'absence d'examens de laboratoire, pour être applicables au niveau des soins de santé primaires.

Des patients consultant pour MST ont été recrutés dans dix formations sanitaires périphériques d'Abidjan (Côte d'Ivoire). Après examen clinique, les médicaments étaient vendus sur place à un prix modique. Parmi ces médicaments MST, la ceftriaxone intramusculaire et une fluoroquinolone orale (la ciprofloxacine) ont été choisies pour les traitements-minute de la gonococcie et du chancre mou; leur prix a été calculé en simulant leur intégration dans la liste des médicaments essentiels du pays. Quatre arbres thérapeutiques inspirés des recommandations de l'Organisation mondiale de la Santé ont été évalués: écoulement urétral (EU), écoulement vaginal (EV) avec et sans examen sous spéculum, ulcération génitale (UG).

Sur les 340 patients avec MST observés en avril 1993, 18% n'ont pas pu payer leur traitement, ce qui était un des motifs de non-inclusion. Au total, 207 patients ont été inclus et revus. Il s'agissait de 89 EU, 92 EV et 26 UG. Le succès thérapeutique, apprécié au 7ème jour, a été obtenu pour 92% des EU, 87% des EV avec ou sans spéculum, et 100% des UG. Moins de 10% des 207 patients ont eu recours au niveau sanitaire supérieur, ce qui est acceptable d'un point de vue de santé publique. Les taux de succès n'étaient pas différents que les patients aient reçu ciprofloxacine ou ceftriaxone. L'observance des algorithmes par les soignants a été excellente pour les EU et les UG, mais médiocre pour les EV avec ou sans spéculum. Dans le cas des EV, les modifications délibérées des algorithmes, justifiées par la symptomatologie des patientes, ont été sans préjudice pour le succès thérapeutique. En revanche, les erreurs de prescription ont eu des répercussions négatives sur le taux de guérison. Les algorithmes gagnent donc à être simplifiés et explicités.

Concernant le prix des médicaments, le coût moyen d'un épisode de MST pour les 207 patients été de 1546 francs CFA (US$5,6) (maximum: 2980 francs CFA (US$ 10,70). Ce coût moyen par épisode a été de 1380 francs CFA (US$ 5,00) pour l'EU, 1788 francs CFA (US$ 6,40) pour l'EV et 1258 francs CFA (US$ 4,50) pour l'UG. Lorsque l'observance de l'algorithme était correcte, l'examen au spéculum a permis de réduire le coût du traitement d'un EV. Le prix du médicament représente la part prépondérante du coût de la prise en charge d'une MST, et doit donc être abordable pour la plupart des patients. Une collaboration étroite entre le programme national de lutte contre les MST et le programme des médicaments essentiels est nécessaire pour obtenir des médicaments MST à la fois efficaces et financièrement accessibles.

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