A survey of staphylococci isolated in hospital practice

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SYNOPSIS In-patient and out-patient strains of coagulase-positive staphylococci were compared and showed a different phage group distribution. Group III predominated in the in-patient series and accounted for nearly all the antibiotic-resistant strains. The prevalence of phage type 80 in breast abscesses was noted. It was found that one in three coagulase-positive staphylococci isolated from hospital in-patients was sensitive to chloramphenicol and erythromycin only.

In 1948, Barber and Rozwadowska-Dowzenko drew attention to the increasing incidence of penicillin-resistant strains of *Staphylococcus aureus* isolated in hospital practice. Fairbrother (1956), examining strains from in-patients and out-patients, found penicillin sensitivity in 36% and 63% respectively. Hennessey and Miles (1958) reported a series of 248 strains of coagulase-positive staphylococci which were sent to them from East Africa, of which 40% were phage type 80; 37% were sensitive to penicillin.

MATERIALS AND METHOD

For a period of four months, from October 1958, to January 1959, swabs were taken from every abscess, infected lesion, or wound seen in the casualty department of this hospital.

All staphylococci isolated were tested for coagulase production by the tube method of Fisk (1940). Coagulase-positive strains were phage typed by the method of Williams and Rippon (1952). Antibiotic sensitivities were determined on agar plates using Evans Sentest tablets:

Penicillin.....	2.5 i.u./tablet
Streptomycin	80 µg./tablet
Tetracyclines	100 µg./tablet
Chloramphenicol	100 µg./tablet
Erythromycin.....	10 µg./tablet

In all 492 strains were examined.

For comparison, 500 strains of staphylococci from in-patients (sputa, boils, specimens of urine, wound, and nasal swabs) collected over the same period were similarly tested.

RESULTS

Table I shows the phage group distribution of all the casualty and hospital in-patient strains. The incidence of group I strains was the same in both groups;

nevertheless, phage 80 staphylococci accounted for 10% of in-patient strains and only 4.5% of casualty strains.

TABLE I
GENERAL PHAGE GROUP DISTRIBUTION

Group	I	II	III	I+III	I+II	IV	NT
Phage	80	Others					
Casualty	23	177	110	97	27	0	53
Cases	4.5%	36.1%	22.5%	19.5%	5.5%	0%	10.9%
In-patient	50	137	39	210	30	3	30
Cases	10.0%	27.1%	7.7%	42.0%	6.0%	0.6%	6.0%
Group I = 29, 52, 52A, 79, 80							
Group II = 3A, 3B, 3C, 55, 71							
Group III = 6, 7, 42E, 47, 53, 54, 75, 78							
Mixed groups, i.e., with lysis to phages of two groups above are classified as such.							
Group IV = 42D, 187 (and miscellaneous)							

Table II shows the antibiotic sensitivities of the strains isolated according to source.

TABLE II
ANTIBIOTIC SENSITIVITY

	Casualty	In-patient
Number of strains isolated	492	500
No. penicillin sensitive	303 (61.5%)	117 (23.4%)
No. penicillin insensitive but sensitive to chloramphenicol, erythromycin, streptomycin and/or tetracyclines	173 (35.3%)	218 (43.6%)
No. sensitive to chloramphenicol and erythromycin only	16 (3.2%)	154 (30.8%)
No. erythromycin sensitive only	0	8 (1.6%)
Insensitive to all	0	3 (0.6%)
	492 (100%)	500 (100%)

Sixty-one per cent of the casualty strains were sensitive to penicillin whereas only 21% of strains from in-patients were sensitive. Thirty per cent of

in-patient strains were sensitive only to chloramphenicol and erythromycin whereas this was so in only 3% of casualty strains.

Group III staphylococci were responsible for most of the antibiotic-resistant organisms in both casualties and in-patients. They accounted for two-thirds of strains sensitive to chloramphenicol and erythromycin only (phage type 80 made up most of the remaining third), most of strains sensitive only to erythromycin, and for all those resistant to the five antibiotics tested.

In in-patients, 1.6% were sensitive to erythromycin only and 0.6% were insensitive to all five antibiotics.

TABLE III
PHAGE GROUPS OF CASUALTY STRAINS
ACCORDING TO SITE

Group	I	II	III	I+III	IV	NT
Phage	80	Others				
Septic hand 249	9	104	70	35	8	2
Breast abscess 18	4	5	4	2	3	—
Axillary abscess 17	—	7	1	4	3	—
Perineal abscess 17	—	5	4	2	2	—

Septic hand included pulp space infections, paronychia, web space infections, etc., and yielded group I in 40% of cases, of which 3.5% were phage type 80.

Eighteen cases of breast abscess were included in the survey; of these, four had phage type 80 infection. All were sent a questionnaire to find if they had

recently been delivered of a child, and if they had been admitted to a hospital or nursing home before the development of the abscess. Replies were received from 14 patients, but among the four who did not answer were two who had phage type 80 staphylococcal infection. Five of the 14, including both the patients with phage type 80 infection who replied, had recently been delivered in hospital.

TABLE IV
ANTIBIOTIC SENSITIVITIES OF PHAGE TYPE 80
STAPHYLOCOCCI

	Sensitive to: Penicillin	Strepto- mycin	Tetra- cyclines	Chloram- phenicol	Erythro- mycin
67 strains	1 ¹	10	6	65	66

¹ Out of 68 strains; the penicillin-sensitive strain was not tested for sensitivity to the other antibiotics.

Although the antibiotic pattern of phage type 80 varies, the predominant one of these strains was sensitive only to chloramphenicol and erythromycin. No phage type 80 was insensitive to all the antibiotics tested.

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