

Ward Infections—A Study of Morbidity During three years

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IT is neither possible nor practicable to guard completely, all the time against all the possible avenues of infection (M. R. C. 1968). At present most interest is concentrated on the post-operative infections in "clean cases". It is often forgotten that traumatic infections as well as chronic infections offer considerable therapeutic problems and constitute an important source of infection (Ligran and Lindberg, 1972).

Materials and Methods

This study was undertaken with the following aims: (1) to find the incidence of wound infection; (2) the bacteria associated with these infections; (3) the emergence of bacteria resistant to antibiotics, and (4) the incidence of other infective illnesses acquired by the patients during their hospital stay.

The nature of the operations were as in any busy plastic surgery unit, the only remarkable feature being a large number of emergency operations which included hand injuries, maxillo-facial injuries and any injury involving loss of skin.

We defined wound infection as clinically visible pus. For burns and other infected raw areas, the wound was considered as infected post-operatively if it did not heal by three weeks after skin grafting. The infection was recorded as minor, if it was confined to the incision; moderate, if there was spread beyond the incision, wound dehiscence or tissue necrosis; and severe, if there was septicaemia.

Observations

There was a reservoir of infected patients in the wards at any time of the year and varied from 5 to 14 out of a total of 38 patients (Table 1). The percentage who developed infection after operation were 11.9%, 16.2% and 9.1% for the three years. About one third of them were "clean cases" while two thirds were already infected. Thrombophlebitis following "cut downs" was observed in about half the cases (Table 2). "Cut downs" were done mostly in major burns and the actual incidence must be higher as it is often difficult to examine the course of the vein due to eschar or dressings. Infection following "stick-in" infusions have become

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Table 1—Post Operative Wound Infection

	71-72	72-73	73-74
1. Number of infected cases on the first day of the month.			
Range per month			
(a) Operated	2—6	4—12	1—5
(b) Unoperated	2—9	2—8	2—7
(c) Total	5—12	6—14	5—9
2. Total number of operations per year :			
(a) Elective	560	637	640
(b) Emergency	363	349	247
(c) Total	923	986	886
(i) Progress without infection	824	826	806
(ii) Developed infection	109	160	81
(iii) Percentage of infection	11.9%	16.2%	9.1%
(iv) Clean cases prior to surgery	36	58	25
(v) Infected cases prior to surgery	73	102	56
4. Severity of Infection :			
(a) Minor	68	146	68
(b) Moderate	40	14	13
(c) Severe	1*	—	—

*Tetanus

Table 2—Other Infective illness and Burns

	71-72	72-73	73-74
(1) Thrombophlebitis :			
(a) "Cut-downs"	6/16	10/ 24	11/ 21
(b) "Stick-ins"	30/80	10/124	7/163
(2) Infective Illnesses (non-operative) :			
(a) Furunculosis	4	5	5
(b) Diarrhoea	9	6	8
(c) Conjunctivitis	10	2	3
(d) Upper Respiratory infection	7	4	5
(e) Measles	1	—	—
(f) Infective Hepatitis	1	—	—
(g) Typoid	1	1	1
(h) Tetanus	2	2	1
(i) Injection abscess	1	—	—
(j) Hookworm disease	1	—	—
(k) Chicken pox	—	1	—
(3) Burns :			
(a) Admissions	95	78	82
(b) Deaths	24	20	30

infrequent since attention was drawn to the previous high morbidity and better care taken in giving infusions.

The patients also suffered from a variety of infective illness partly due to the hospital environment. The serious ones have been tetanus, typhoid, infective hepatitis, measles and chicken pox which necessitated isolation and special treatment.

Staphylococcus pyogenes is still the commonest organism grown from wound swabs, however, the incidence seems to have decreased in relation to the Gram negative bacteria (Fig. No. 1). Throat swabs were sent routinely from all cleft lip and palate patients, these grew Staph. pyogenes most commonly, followed by Klebsiella, Pseudomonas and beta haemolytic streptococci.

Sensitivity tests showed 30% to 50% of the Staphylococcus pyogenes to be sensitive to the commonly used antibiotics (Table III). In contrast, most of the Pseudomonas were resistant to these antibiotics. It was noted that if the bacteria was resistant to penicillin and streptomycin it was also almost invariably resistant to tetracyclines.

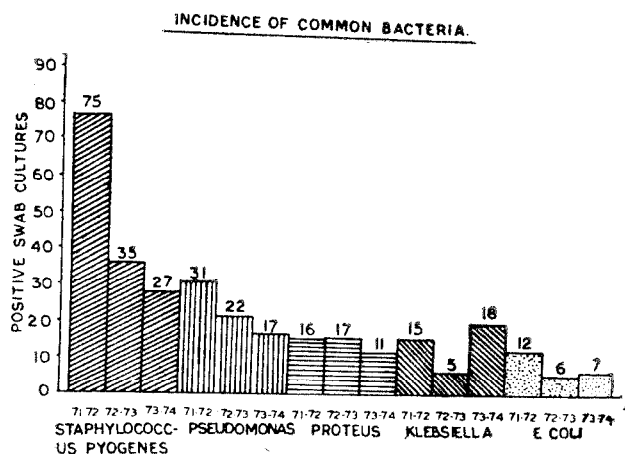


FIG 1

Table 3—Sensitivity to Antibiotics of common Bacteria

No	Bacteria	Sensitive to Penicillin, Streptomycin Tetracyclines			Sensitive to other antibiotics			Sensitive to none		
		71-72	72-73	73-74	71-72	72-73	73-74	71-72	72-73	73-74
1.	Staphylococcus pyogenes	24	12	12	41	18	15	2	3	—
2.	Pseudomonas Aeurogenosa	2	1	—	22	24	17	—	1	—
3.	Proteus Mirabilis	4	4	—	9	12	13	—	1	1
4.	Klebsiella aerogenes	1	4	6	11	4	12	1	1	1
5.	Escherechia coli	0	2	3	9	5	4	—	—	—

During these three years we encountered bacteria resistant against all tested antibiotics on 11 occasions. Interestingly, none of these wounds were clinically severely infected and they healed with dressings only, except in two burn patients who were on the mend and needed skin grafting.

Discussion :

It is difficult to explain the variations in the infection rates for the three years under study. Davis et al. (1973) also noted that their infection rates varied from month to month and year to year without any consistent pattern. They urge caution before assuming that a fall in wound infection rates is due to any particular measure or the administration of an antibiotic.

The high incidence of infective complications associated with indwelling intravenous catheters has been extensively reported (Thoburn et al 1968; Freeman et al. 1972). Autopsies on some burn victims revealed an infective thrombus at the catheter's tip with septic emboli in various organs.

Few studies are available regarding the overall frequency and character of diverse types of infections within hospital. Thoburn et al (1972) reported the incidence of nosocomial infection at the John Hopkin's Hospital to be 4%. They also noted the prevalence of acquired infections like conjunctivitis, serum hepatitis, otitis, furunculosis, chicken pox, diarrhoea and pharyngitis. The data indicate that gram negative orga-

nisms are assuming an increasingly important role in nosocomial infections (Thoburn et al, 1968; Anderson et al, 1972).

An operative infection rate of 3% to 5% in "clean cases" is an acceptable figure which can be achieved by simple measures. The main areas where wound infection can occur are the emergency service, the operation theatre and the wards. Emergency is a busy area, under staffed, with periods of great activity, and with a tendency to short cut aseptic methods. Dressing techniques should be strictly "no touch", the wound should be exposed for the minimum time and the necessary operation done as soon as the patient is fit. The value of efficient debridement and delayed primary closure must be emphasised to each fresh batch of trainees. In the operation theatre traffic should be restricted to essential staff. One of the great stumbling blocks to the prevention of infection in the operating rooms is not the lack of proper equipment and machines but rather the lack of discipline, the enforcement of good technique (Dinnen, 1973). In the wards dressings should be done by a "no touch" technique using only sterilised instruments and dressing materials in a properly equipped dressing room. The dressing schedule should be arranged so that "clean cases" are done first, proceeding last to the heavily infected cases and burns. The dressings room should be left free for at least 12 hours to allow bacteria dispersed into the air to settle down to the floor. For efficient dressing a team of three persons is essential, the

nurse, the dresser and an assistant.

Interest in ward infections tends to be bimodally distributed, with peaks in the zones corresponding to obsession and to apathy, and little in the central zone of reasonableness and practical common sense. The state of hospital infections reminds one forcefully that man lives in one great ecosystem, and nature except in broadest outline is seldom simple (Peterson 1972).

Summary :

The state of infection in the Division of

Plastic Surgery at Post-graduate Institute of Medical Education and Research, Chandigarh over a period of three years has been described. The increasing prevalence of gram negative organism in nosocomial infections has been observed. An acceptable rate of wound infection in "clean cases" can be achieved by vigilance and simple measures.

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