

THE INCREASE IN SERIOUS STAPHYLOCOCCAL INFECTIONS AS SHOWN BY POST-MORTEM INVESTIGATION*

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IN RECENT YEARS staphylococcal infections have become a serious problem in a hospital community. The high carrier rate and the resistance of the causative organism, *Micrococcus pyogenes* (Staphylococcus), to antibiotics have largely been blamed for the situation. As a result, greatest attention has been directed toward the appearance of antibiotic-resistant staphylococci, and this has been dealt with in a number of reviews, particularly those of Prissick¹ and of Welch.² Jackson³ and his associates were among the first to point out the potentialities of the staphylococcus as a dangerous pathogen when they reported that of 91 cases of pneumococcal pneumonia, 7 died of staphylococcal infection following treatment with oxytetracycline. It is the purpose of this report to emphasize that this organism can become markedly virulent in individuals who have a lowered resistance due to some underlying condition which renders them susceptible to secondary infection.

It is routine procedure in this hospital to culture specimens of heart's blood and swabs taken from the cut surfaces of lungs and other infected areas of all cases coming to autopsy. The results of 213 cases are shown in Table I, and the sites of origin of *Micrococcus pyogenes* in Table II.

These results are most striking in view of the fact that the records of 1950 (311 autopsies) show three cases of bronchopneumonia and two cases of septicæmia due to staphylococci, although this figure may be low since it was not routine practice at that time to take specimens from all autopsies. With the exception of three patients who were admitted with a diagnosis of staphylococcal septicæmia, all the infections are considered to be secondary to other obvious debilitating features. The staphylococcal infection was not the primary cause of death but the terminal event in the course of some major disease.

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TABLE I.

AUTOPSY CULTURES	
<i>Organism isolated</i>	<i>No. of cases</i>
<i>Micrococcus pyogenes</i>	87
<i>Diplococcus pneumoniae</i>	4
<i>Klebsiella pneumoniae</i>	3
<i>Streptococcus pyogenes</i>	1

TABLE II.

SITE OF ORIGIN OF <i>Micrococcus pyogenes</i> AT AUTOPSY	
<i>Specimen taken from</i>	<i>No. of cases</i>
Heart's blood.....	2
Lungs.....	64
Heart's blood and lungs.....	14
Kidneys.....	3
Meninges.....	1
Pericardial sac.....	1
Subdiaphragmatic abscess.....	1
Appendix.....	1

Bacteriophage typing was used in an attempt to determine a possible relationship among the organisms isolated. If infection from carriers or other sources within the hospital had occurred, a predominant phage type would appear. The phage-groups of 52 of the strains are recorded in Table III.

TABLE III.

PHAGE GROUPS	
<i>Phage group</i>	<i>Per cent</i>
I.....	23
II.....	4
III.....	61
IV.....	6
Untypable.....	6

The greatest percentage of strains belonged to Group III. Since this is a broad group, it is significant that 50% of the Group III staphylococci belonged to a single phage type—47.

The staphylococci isolated were tested for sensitivity to penicillin, oxytetracycline, chlorotetracycline and chloramphenicol. The following results were obtained:

Sensitive to all antibiotics 18%
Sensitive to all antibiotics except penicillin .. 30%
Sensitive to chloramphenicol only 52%

This represents a high percentage (82%) of penicillin-resistant staphylococci. The most important group, however, is the one which is

sensitive to chloramphenicol but resistant to oxytetracycline, chlortetracycline and penicillin. This is the antibiotic pattern most commonly reported in this hospital. It is interesting that no strains were encountered which were resistant to all the antibiotics tested, and this is fortunately also true of strains identified from the hospitalized patient. Whether this situation will continue with the increased use of chloramphenicol is doubtful.

CONCLUSIONS

1. *Micrococcus pyogenes* (Staphylococcus) has replaced *Diplococcus pneumoniae* and *Streptococcus pyogenes* as the cause of terminal bronchopneumonia.

2. In a hospital community there is increased opportunity for staphylococcal infections from a variety of sources. The predominant strain isolated in this investigation was one sensitive to chloramphenicol and resistant to other antibiotics.

3. The potentialities of the staphylococcus as a virulent pathogen should not be overlooked, and treatment of infections with a specific antibiotic should be vigorous.

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REACTIONS TO LOCAL ANÆSTHETICS*

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TOXIC REACTIONS to local anæsthetics are fortunately rare, but whatever the route of administration or the drug used, the possibility of their occurrence must not be ignored. The widespread use of cocaine following its introduction to medicine by Köller in 1884 led to numerous reports of its toxicity. In 1890, Falk¹ collected 176 cases of acute intoxication of which 10 were fatal. Procaine, a much less toxic drug, was introduced in 1905 by Einhorn, and its continued popularity throughout over half a century is testimony to its safety. Countless attempts have been made to synthesize drugs which, while still retaining the low toxicity of procaine, are more effective. This has led to an unending stream of new compounds, many of which have recently been reviewed.² A paper by Hofmann and Held³ tabulates references to toxic reactions to most drugs that have been used clinically.

The purpose of this paper is to review the recent literature on this subject and to emphasize the importance of the underlying pathological processes with reference to developing a rational treatment of reactions.

Many papers have been published on this subject. Steinhaus has pointed out that the problem is difficult to study, first because these reactions are unexpected and second because the number of cases which can be observed by one investigator is comparatively small.

The report of the Mayer committee⁴ was one of the early significant studies of clinical reactions. They reported 43 previously unpublished cases of death due to local anæsthetics, almost half of which were due to the injection of cocaine before tonsillectomy. Because of its toxicity, all authorities now condemn the use of cocaine for infiltration purposes. The Mayer report showed that the occurrence of an accident seldom found the operator ready to apply suitable measures promptly. The committee advised artificial respiration and cardiac massage as the most effective methods of treatment for these intoxications.

Not all reactions are serious. It is just as important to look for and recognize the minor toxic manifestations. These act as a warning that further administration of local anæsthetic may lead to more serious symptoms.

CAUSES OF REACTION

Psychogenic Influences.—Apart from the drug used, other influences may act upon the patient. A dread of local anæsthesia resulting from a previous experience, or the anxiety of friends or relatives, leads to tension and nervousness, and

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