

infections and the significant disability among many of those who survive, the various therapeutic regimens proposed have not been evaluated as thoroughly as is desirable.

Some of the problems that complicate analysis of the various therapeutic routines advocated in the past are readily apparent. The incidence of bacterial meningitis infections is not great, and the relative etiologic importance of particular bacterial species varies with the age group considered. Rates of bacterial meningitis approach 1:1000 live births during the neonatal period. The rates fall rapidly during infancy and childhood. This progressive decline in age specific rates continues until the fifth decade. It then rises slightly with the increase in pneumococcal infections among older persons. Because of these low rates, relatively few patients are available for study in any single hospital. In addition, the diagnosis of these infections is often made in hospitals other than those providing definitive treatment. Referral for definitive treatment may be made after some form of treatment has been initiated. This referral is usually to other hospitals on the basis of age group, economic status, or other selective determinants. These factors make the interpretation of experience within a single hospital, unless carefully controlled, subject to serious errors. It is also obvious that experience in different hospitals with different routines cannot be compared, yet several attempts to do so have been made. As yet, no well controlled cooperative study has been attempted, involving several large institutions, to evaluate the management of this type of infection, although such an effort might yield useful data. If such a study were contemplated, these and still other factors must be properly controlled.

The severity of the illness and the progressive nature of the disease often introduce additional variables with respect to supportive therapy. This support, dependent upon experienced nursing and medical personnel, is necessary if the patient is to survive long enough for an antimicrobial drug to have any benefit. This situation is further complicated by a fixed and mystical belief that if one antimicrobial agent is good, two must be better, and three even more efficacious, despite evidence to the contrary. (1)

It is the purpose of this paper to examine some of the characteristics of bacterial meningitis and the factors important in survival. In addition, the results of treatment with ampicillin alone and ampicillin plus chloramphenicol supplemented by two days of streptomycin therapy will be presented.

If one examines the case fatality rates for a particular type of bacterial meningitis on our service during successive years, it is interesting to note the substantial variation in mortality. If one contrasts selected years, this variation is greater than expected by chance alone. As yet, we have no explanation for these variations. This pattern is clearly illustrated by meningococcal infections treated on our service during the past six years, as shown in Table 1. During this time, Type B meningococci have been predominant, and approximately one-third of the strains tested have been resistant to sulfadiazine ($MIC \geq 10$ mg/100 ml). (2)

NATURAL VARIATION IN CASE FATALITY RATES

TABLE 1.—MENINGOCOCCAL DISEASE, CASE FATALITY RATIOS BY YEAR, LOS ANGELES COUNTY GENERAL HOSPITAL

Year of treatment	Outcome of patient		Total cases	Case fatality (percent)
	Survived	Died		
1961.....	34	4	38	10.5
1962.....	64	6	70	8.6
1963.....	67	6	73	8.2
1964.....	85	14	99	14.1
1965.....	88	3	91	3.3
1966 ²	86	6	92	6.5
Total.....	424	39	463	(8.4)

¹ $\chi^2 = 6.74$; $p < 0.01$.² Through October 1966.

NOTE.—Numbered references at end of article.