Acute pharyngitis is a common illness in children and adults and its etiology includes a wide variety of microbial agents. Group A streptococci (GAS) are the most frequently isolated pathogens in acute pharyngotonsillitis cases in school-aged children. In children, approximately 20% of pharyngitis cases are caused by GAS (1). Streptococcal sore throat is one of the most common bacterial infections of childhood. GAS are responsible for the great majority of such infections and frequently colonize in the throat of an asymptomatic person. Pharyngeal carriage rates among normal school children vary with the geographic location and season of the year. Among children, asymptomatic carriage rates of 15-20% have been noted in several studies (2). GAS consists of a single species, Streptococcus pyogenes (2). This microorganism causes complete hemolysis of red blood cells on sheep blood agar. The pathogenesis of GAS is mediated by a variety of factors. One of them is streptolysin O toxin, which damages cell membranes and accounts for the hemolysis demonstrated on sheep blood agar. In addition to pharyngitis, GAS are also one of the etiologic agents of impetigo, cellulitis, and scarlet fever. Further, GAS can cause serious postinfection syndromes such as acute rheumatic fever and post-streptococcal glomerulonephritis. GAS infection is ordinarily spread by direct person-to-person contact, most likely via drops of saliva or nasal secretions. Respiratory droplets are the usual mechanism of spread because this organism primarily localizes in the throat (1,2).

In the present study, we investigated the rate of GAS carriage in school children in Duzce, Turkey in spring. A total of 351 children (148 girls [42.2%] and 203 boys [57.8%]) were included in the study. The ages of the children ranged between 11 and 13 years (mean: 11.9 ± 0.7 years). Prospective cultures from the asymptomatic primary school children were included in the study, and 91 (25.9%) of these were found to be GAS carriers. Of the 91 carrier students, ASO titers were elevated (≥200 IU/ml) in 34 students (37%). Of the 260 non-carrier children, ASO titers were found as elevated (≥200 IU/ml) only in 27 (10.3%) students. The difference between the ASO-positivity rate of the GAS carrier group (34 in 91 students) and that of the non-carrier group (27 in 260 students) was found to be statistically significant (P < 0.05). The finding of a significant relationship between ASO positivity and GAS carriage indicated that ASO measurement might be used together with throat culture to identify GAS carriers.
of the GAS carrier group (34 of 91 students) and that of its complications both in carriers and their contacts. In carriers may help in diminishing streptococcal disease and positive throat cultures. In the present study, we investigated presenting with upper respiratory tract symptoms and et al. (3) reported elevated ASO titers in 54.1% of children in children who carried A, C, and G streptococci. Nussinovitch healthy school children. They reported elevated ASO responses to the carrier state of Okuyama et al. (10) have examined the relationship of ASO asymptomatic school children. This result is within the ranges of streptococcal infections. children with post-streptococcal infection represent a source important, since it leads to post-streptococcal infection, and lence of 13%. As they pointed out, GAS carriage is highly asymptomatic primary school children and reported a prev-
ance of 28%. Metintas et al. (8) examined GAS carriage in primary school students in Afyon, Turkey was 6%, and that the rate in more affluent, suburban students was 28%. Metintas et al. (8) examined GAS carriage in asymptomatic primary school children and reported a prevalence of 13%. As they pointed out, GAS carriage is highly important, since it leads to post-streptococcal infection, and children with post-streptococcal infection represent a source of streptococcal infections.

In our study, the isolation rate of GAS was 25.9% in asymptomatic school children. This result is within the ranges reported from different centers in Turkey and other countries. Okuyama et al. (10) have examined the relationship of ASO to the carrier state of β hemolytic Streptococcus in throats of healthy school children. They reported elevated ASO responses in children who carried A, C, and G streptococci. Nussinovitch et al. (3) reported elevated ASO titers in 54.1% of children presenting with upper respiratory tract symptoms and positive throat cultures. In the present study, we investigated only GAS carriage in throat specimens. Detection of GAS carriers may help in diminishing streptococcal disease and its complications both in carriers and their contacts. In conclusion, the GAS carriage rate was found to be 25.9% in our study. The difference between the ASO-positivity rate of the GAS carrier group (34 of 91 students) and that of the non-carrier group (27 of 260 students) was found to be statistically significant (P < 0.05). The finding of a significant relationship between ASO positivity and the carriage of GAS indicated that ASO measurement might be used together with throat culture to identify GAS carriers. The ASO values were determined to be between 0-80 IU/ml and 200-400 IU/ml in the non-carrier group and carrier group, respectively (Fig. 1). The sensitivity and specificity of ASO values for predicting GAS carriage were found to be 37 and 89%, respectively. It is concluded that GAS carriers can not be determined by their ASO values alone.

APPENDIX

This study was presented at the 3rd Balkan Conference of Microbiology, September 4-6, 2003, Istanbul, Turkey.

REFERENCES