Clinical Clues / *Klinik İpuçları*

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Should Prophylaxis Be Given to Close Contacts of A Child with Meningococcal Bacteria in Throat Culture?

Boğaz Kültüründe Meningokok Üreyen Çocuğun Yakın Temaslılarına Profilaksi Vermek Gerekir mi?

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Question: *A child in the same school but a different class as a child hospitalized with meningococcal meningitis has tested positive for meningococcus in throat culture. Should prophylaxis be given to the contacts of this child in the other class?* **Ayşenur Demirci, MD.**

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Answer (Esra Çiftci, MD; Mustafa Kemal Hacımustafaoğlu, MD)

Introduction and general information: Invasive meningococcal disease (IMD) is a serious and potentially fatal illness. IMD is most commonly seen in children under the age of five years, adolescents and young adults (typically 11-23 years old), and older adults. Adolescents and young adults have the highest carrier rates across all age groups although this varies by region (1,2). A significant proportion of meningococcal strains are capsular, but the invasive strains that cause IMD typically contain a polysaccharide capsule. The polysaccharide capsule plays a crucial role in pathogenicity and invasive infection. There are 12 different invasive meningococcal strains based on their polysaccharide capsule type (1,3,4).

Neisseria meningitidis can be carried as a commensal microorganism in the nasopharynx, particularly in adolescents and young adults. Asymptomatic nasopharyngeal carriage varies according to age group (most common in adolescents and young adults) and other factors (e.g., military personnel, boarding school students, especially in the first year). Asymptomatic carriage is generally detected in 5-25% of the general population (5-7). Spontaneous loss of nasopharyngeal *N. meningitidis* carriage and/or acquisition of new *N. meningitidis* strains (capsulated or non-capsulated) may occur. In cases where prophylaxis is administered, carriage may recur after the effect of prophylaxis wears off. In a study conducted in Israel, the serogroup B colonization rate, which was initially 4.6%, decreased to 0% after three weeks of community prophylaxis, then increased to 0.5% at six months and 3.9% at one year (8). In a study conducted in Denmark, asymptomatic carriage was observed in 39-47% of soldiers, and over time, changes in carriage (loss of carriage and/or new carriage with a different serogroup) were observed in 34% of cases (9). Another study showed that antibody responses associated with carriage developed in military personnel, and this antibody positivity was linked to newly acquired strains (10). In most cases of carriage, systemic immunization and

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serogroup-specific protective antibodies may develop, but information on the protective efficacy and duration of these antibodies against active disease is very limited (4,6). Asymptomatic carriage may be associated with pathogenic or non-pathogenic *N. meningitidis*, and invasive disease develops in only a small proportion of carrier cases (3,4,6). This probability can be estimated as <5/100000 in an adolescent or pre-adolescent child with *N. meningitidis* growing in a throat culture (assuming living in a population with a carrier rate of 25%). However, this probability is higher in close contacts of a patient with IMD (estimated to be approximately 3/1000). For carrier assessment, culture should preferably be obtained from the nasopharynx. Throat cultures and saliva tests detect the pathogen at much lower rates (11). There is no indication for prior nasopharyngeal culture testing in close contacts of a patient with IMD for prophylaxis. Additionally, there is no indication for nasopharyngeal culture testing in individuals from the environment who are not close contacts for prophylaxis evaluation.

Carriage of *N. meningitidis* in the nasopharynx, particularly in cases with IMD, plays an important role in transmission and the development of IMD in close contacts. This situation (secondary IMD cases) typically occurs within the first 1-2 weeks after acquiring carriage, or within the first four days (1-10 days) following exposure to an IMD case (7). Nasopharyngeal *N. meningitidis* colonization precedes the development of IMD clinical symptoms and is a prerequisite for IMD. However, in the absence of an outbreak and/or close contact with an IMD case, the detection of *N. meningitidis* in throat or nasopharyngeal cultures in an asymptomatic patient (or a patient with non-specific upper respiratory tract infection symptoms) does not indicate the need for treatment (2). *N. meningitidis,* rarely causes pneumonia, but it is not among the major causes of upper respiratory tract infections such as acute tonsillitis or pharyngitis. Therefore, it does not indicate treatment. However, in cases of close contact with IMD, prophylaxis is indicated even without the indication for a nasopharyngeal culture.

In light of this general information, the answer to the question can be summarized as follows:

1) There is no indication for prophylaxis in a person who is not considered to be in close contact with a child with IMD (i.e., another class with no close contact). There is no need to take a throat culture (more accurately, a nasopharyngeal culture) from this person. In such a situation, there is no scientific evidence to support deciding on patient treatment based on the throat culture result. However, it may be recommended to monitor the child for 10 days (especially the first four days) for symptoms of IMD.

2) If the family has serious concerns about this issue, the authors' alternative opinion is as follows: After informing the family about this issue and the possibilities, and taking the family's views into consideration, within the framework of a shared clinical decision, it may be recommended to monitor the child for 10 days (especially the first four days) for clinical signs of IMD, with or without prophylaxis.

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