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Cross Infection Produced by Tetracycline-Resistant Pneumococci

By

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While literature until 1963 contains no reports on the occurrence of antibiotic resistant pneumococci, several cases have been described since then in which adult patients, treated with tetracycline, developed grave complications due to pneumococci resistant to the drug [2, 3, 4].

Four patients, observed in this department in January and February, 1965, developed infection with resistant pneumococci during their treatment with sigmamycin and oxytetracycline.

Pneumococcus was isolated from the nasal secretion and the throat swab in pure cultures in three cases, while the culture obtained from the nasal secretion yielded also staphylococci in the fourth case. Resistance was determined by the disk method; the strains were identified on the basis of colony morphology, microscopy and taurocholate lysis. No typing was performed.

Case Reports

Case No. 1. Z. L., a male infant of 10 months, was admitted on January 18 with chronic otitis. The baby had no fever and displayed no clinical symptoms. The ear secretion yielded *Staphylococcus aureus*. The resistance pattern having been determined, treatment with sigmamycin was instituted on January 23. The baby 3 days later developed grave bronchiolitis and bronchopneumonia, while the otologic condition showed improvement. A pure culture of tetracycline and sigmamycin resistant pneumococci was obtained from the throat swab on the 26th, and one from the nasal smear on the 27th, of January. It seemed necessary to change the treatment before the result of the resistance test had become known: the baby was given resistomycin and penicillin as from the 27th of January. The response was slight, the grave dyspnoea persisted, the lips were greyish, the liver was enlarged to 3 fingers below the costal arc. Treatment was changed to erythromycin on January 29 when the resistance results had arrived. The response was pronounced; dyspnoea had disappeared by the 31st and all pulmonary symptoms by February 1. A pure culture of pneumococcus was obtained from the throat swab for the third time on January 30; the pharyngeal flora had become normal and the ear complaints had completely ceased by the 1st of February.

Case No. 2. Zs. P., age 15 months, was admitted with pneumonia and pleurisy on January 19. At admission, the pharyngeal flora was normal. The patient received penicillin and streptomycin from the 19th to the 21st, and sigmamycin from the 22nd

January to the 1st of February. Fever persisted, the patient's condition remained unchanged, and X-rays revealed hardly any improvement. A throat swab on January 30 yielded a pure growth of pneumococci resistant to tetracycline and sigmamycin. Treatment was changed to erythromycin on February 1; dulness on the right side was no longer perceptible on the 4th, and the patient was discharged in a good condition on February 15.

Case No. 3. T. D., 11 months of age, was admitted on February 11th on account of typical pseudo-croup of medium intensity. On admission, the pharyngeal flora was normal. The baby lay in the same ward with Zs. P. *(Case No. 2.)* Treatment between February 11th and 15th consisted in intramuscular tetracycline. Fever persisted, and physical and radiological manifestations of pneumonia had developed by the 16th of February. Tetracycline-resistant pneumococcus was isolated from the nasal smear collected on the 18th of February. The fever persisted and the next day erythromycin treatment was started. This brought rapid improvement, and the patient was discharged in a good condition on the 24th of February.

Case No. 4. K. B., 2 years old, had had measles 2 weeks before admission. Fever had persisted, the cough had become worse and dyspnoea appeared; the attending physician had prescribed oxytetracycline. The condition had continued to deteriorate and the child was referred to us on the 26th of February. Pneumonia and pleurisy on the left side were diagnosed at admission; sigmamycin was prescribed on the first day and then chloramphenicol until the 1st of March. The nasal secretion, obtained on the day after admission, yielded a mixed culture of pneumococci and *Staphylococcus aureus* both of which were resistant to tetracycline. Treatment with erythromycin was started on the 2nd of March, and the fever subsided on the next day. Pleural puncture was performed on the 1st of March, and 65 ml of serous fluid were withdrawn which contained no pathogens. The patient was discharged on the 22nd of March, with normal physical and X-ray findings.

Discussion

In the above described four cases it was in the course of tetracycline treatment that the resistant strains became dominant in the nasal secretion; this phenomenon was accompanied by the development of pneumonia in two cases and by a delay of improvement in the other two cases. All patients responded to erythromycin, a compound to which the isolated pneumococci were highly sensitive. Turner [4] has made the same observation. Let us add that only 47 per cent of the staphylococcus strains isolated in the department at that time showed sensitivity to erythromycin.

Resistant pneumococcal infection of infants and children has, to our knowledge, not yet been described. Another intriguing feature of these cases was that, in two instances, infection supervened in the course of sigmamycin treatment. Since sigmamycin contains tetracycline and oleandomycin, the two strains were assayed for sensitivity to oleandomycin and found to be insensitive to this molecule also. The examined pneumococcus strains displayed complete resistance to streptomycin as well, but were sensitive to all the other antibiotics.

Resistant pneumococcus strains are of recent origin; their rare occurrence has not been explained. Since, as in the case of Turner [4], the

infection was mixed (pneumococcus + staphylococcus) in two of the present four cases the problem of episomal transfer [1], i.e. the transmission from species to species, arises. Although infections by tetracycline-resistant pneumococci are still rare, they constitute a potential danger and should not be disregarded when instituting tetracycline treatment.

Summary

In four children, while being treated with tetracycline and sigmamycin, pneumococcus strains appeared resistant to these drugs in the nasal and pharyngeal secretion. Resistant pneumococcal infection was accompanied by pneumonia in two cases, and by a delayed improvement of pneumonia and pleuritis likewise in two cases. The course of pneumonia developed by an infant during sigmamycin treatment was extremely grave.

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