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NEONATAL PNEUMONIA CAUSED BY *TRICHOMONAS VAGINALIS*

K. SZARKA[1], P. TEMESVÁRI[2], A. KEREKES[2], A. TEGE[2] AND A. REPKÉNY[1]

[1]Laboratory of Microbiology, National Institute of Health, Bács-Kiskun County, Kecskemét (NPHMOS), PO Box 119, H-6001 Kecskemét, Hungary
[2]Department of Pediatrics, University Teaching Hospital, Kecskemét, Hungary

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The authors present two cases of newborn babies infected by *Trichomonas vaginalis* (hereafter referred to as *T. vaginalis*) and suffering from severe congenital breathing difficulties and needing artificial respiration. Microscopic examination of the tracheal discharge revealed characteristically moving, flagellated, pear-shaped unicellular organisms. Cultures on CPLM medium proved the presence of *T. vaginalis*. During pregnancy the mothers' clinical status was negative and both of them mentioned leukorrhoea of changing intensity. They were regularly involved in antenatal care. The infection caused by *T. vaginalis* could be detected in the two mothers later by culture procedures.

Keywords: *T. vaginalis*, congenital respiratory difficulty, protozoan culture, antenatal care

Introduction

Protozoa belonging to the class of Mastigophora have flagella in varying number and this number is species-specific. *T. vaginalis*, responsible for the disease trichomoniasis, is clinically one of the most important flagellata. The characteristics of these protozoa include a big central nucleus, four free-moving flagella. Its average size is about 5–20 μm and is pear-shaped. An axostyl runs through its body, it never forms cysts and exists only in trophozoite form. It shows strong adhesivity to epithelial cells. The enzyme system, which consists of haemolysine, soluble proteinases and cell-separating factors, enables it to damage cells. The parasite lives mostly in the urogenital tract, settles primarily in the vagina and in the prostate gland. It generates infections in the Skene-passages of the vagina, which can be asymptomatic as well. The pathogen disperses via sexual contact but other factors and the shared use of

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towels and bath may also play a role in infection. Itchiness, an odorous, frothy, greenish yellow discharge give the symptoms of the infection, furthermore they can couple with dysparenuria and external type dysuria [3, 11]. The pH of the vaginal discharge is higher than 4.5. Trichomoniasis is one of the most frequent human infections, which affects approximately 180 million people each year all over the world. 50% of the infected women are symptomatic. The diagnosis is often based on the presence of the motile protozoan, which can be detected from discharges microscopically, although the sensitivity of this method ranges only between 38–80% [2]. The most reliable culture process is the gold standard of the diagnosis because an inoculum of 300–500 protozoa/m1 is already a sufficient amount to induce growth.

Materials and methods

T. vaginalis was cultured on a special, semi-liquid medium, which also serves to collect and hand-in samples. The CPLM medium developed by Johnson and Trussel and modified by Zsuzsanna Szénási (University of Szeged, Faculty of General Medicine Central Laboratory for Clinical Microbiology, Szeged, Hungary) contains OXOID liver-extract, cysteine, peptone, OXOID agar, maltose, sterile horse-serum, antibiotics and other substrates [4, 7, 13]. The medium, which is stored refrigerated in sterile tubes, can be used for half a year. Before inoculation the medium has to be warmed up to room temperature for 20–30 minutes and subsequently the cervical, vaginal, urethral and other discharges collected with a cotton-wool swab are inoculated by immersing them into the medium. Protozoa begin to proliferate in the semi-liquid medium and sometimes they can be detected by direct microscopy as soon as 8–10 hours have elapsed. The culture process takes 2–5 days to complete.

Case studies

Our first affected patient (I) was born in vaginal way on the 33rd week of pregnancy, weighed 1320 g and was a girl. Her Apgar values were 9/9. Our second patient (II) was also born in vaginal way on the 35th week of pregnancy, weighed 2500 9 and was a boy. His Apgar values were 6/8. Their mothers had a negative clinical status during pregnancy, they were regularly involved in antenatal care and both of them have mentioned leukorrhoea of varying intensity. After birth the newborn babies were taken into the perinatal unit of the children's ward in a satisfying general state of health. At the end of her first day the first baby (I) developed tachypnoe and dyspnea and required treatment. The same difficulties arose at 8 hours of age in case of the

second baby (II). Over the breast weaker respiratory sounds and wet slurping noises were heard in both cases. X-ray images of the breast revealed a reduced diffuse transparency of the lungs with central aerobronchogram. The progressive pulmonal process required tracheal intubation and discharge removal, which resulted in a bouillon-like liquid (I: 2 ml; II: 4 ml) and then artificial respiration took place. Numerous white blood cells, most of which were neutrophil granulocytes and characteristically moving, unicellular flagellated organisms appeared during the microscopic examination of the trachea-aspirates. The tracheal discharges were further investigated in a microbiological laboratory. Bacterial cultures were established and brought a negative result. Cultures on the CPLM medium, however, proved the presence of *T. vaginalis* in the discharges of both patients. Blood culture examinations were also carried out in the two cases, but no bacteria were found. The trachea-aspirate of the second baby (II) was tested with MYCOFAST SCREENING EVOLUTION2® (INTERNATIONAL MICROBIO STAGO GROUP) to detect *Mycoplasma hominis* and *Ureaplasma urealyticum* and the result was also negative. Similarly the nasopharyngeal discharge of this patient was examined for *Chlamydia trachomatis* antigen with IDEA TM PCE® Chlamydia (DAKO) assay and the result was the same as above. *T. vaginalis* could be detected from the vaginal discharges of the two mothers. Some data from the clinical documentation of the newborn babies are worth mentioning. Thrombocytopenia was observed on the first and the third day of the life of the first patient who was not examined with CRP. There was no significant abnormality in the blood-picture in our second case but on the first, second and fourteenth days of life CRP was carried out and brought negative, 48 mg/l (++) and negative results, respectively. Clinical, radiological as well as microbiological examinations could establish the diagnosis of congenital pneumonia in both cases. The condition of the patients gradually improved due to artificial respiration, surface-active material, parenteral antiprotozoan agent (five-day-long treatment with 15 mg/body kg/day metronidazole) and a therapy with antibiotics and immunoglobulin, which had been started earlier. Extubation was performed at the one-week-old babies. They left the unit in a healthy state at the age of two months (I) and of one month (II). After detecting the microorganisms in the tracheal discharges by microscopic examination the metronidazole treatment was commenced within 1–2 hours. The application of the complex therapy makes it difficult to assess the correlation between the improvement in health condition and the use of metronidazole treatment. By the second day following the introduction of the complex therapy considerable improvement was discerned from the X-ray images of the breast in both of our patients. At this time *T. vaginalis* could not be detected anymore from the tracheal discharges. The reason for

the further three-week-long medical treatment of our second premature baby was a nourishing impediment caused by gastrooesophageal reflux.

Discussion

The problems of differential diagnosis of respiratory difficulties in premature babies often confuse the neonatologist who has to make every effort to cure the day-to-day worsening inadequate pulmonal functions and to reveal the causes at the same time. The etiological importance of the occurrence of *T. vaginalis* among newborn babies and children has been quite underestimated nowadays. However, several authors have related trichomoniasis during pregnancy with threatening premature birth, early membrane rupture and the failure of intrauterin development [9, 14]. Some authors already supposed in the mid 80s that the pathogen might play a role in neonatal pneumonia [6, 8]. Vaginal infection caused by Trichomonas can be detected in 5–25% of pregnant women and 5% of newborn babies become infected during birth – US data [1] – but few cases of trichomonas infections are reported at this age. The infections can be manifested in neonatal vulvovaginitis, abacterial pyuria, conjunctivitis, rhinitis, pharyngitis but they are usually asymptomatic [1, 10, 12, 13]. The newborn baby catches the disease from the infected mother via direct vulvovaginal contamination, but sometimes the meconium of the baby may be involved in the process because the infant can swallow some maternal trichomonas while it passes through the birth tracts. The stomach-content being neutral at the moment of birth, *T. vaginalis* can survive the way through the baby's digestive system and the newborn may become infected by its faces [1, 13]. Trichomoniasis during pregnancy is often overlooked in Hungary, that is the reason why we have no evidence of infection in newborn babies [10, 12]. According to both international and national literature the two premature patients presented above are the first cases in which the activity of *T. vaginalis* resulting in respiratory difficulties and the development of pneumonia within 24 hours after birth could be proved. Furthermore, the adequate antiprotozoan medical treatment of the newborn babies was performed successfully.

References

1. Al-Salihi,F.L.: Neonatal *Trichomonas vaginalis*. Pediatrics **53**, 196–200 (1974)
2. Bickley,L.S., Krischer,K.K., Punsalang,A. et al: Comparison of direct fluorescent antibody, acridine orange, wet mount, and culture for detection of *Trichomonas vaginalis* in women attending a public sexually transmitted diseases clinic. Sex Transm Dis **16**, 127–131 (1989)
3. Brunham,R.C., Paavonen,I., Stevens,C.E. et al: Mucopurulent cervicitis – the ignored counterpart in women of urethritis in men. N Engl J Med **311**, 1–6 (1984)
4. Diamond,L.S.: Lumen dwelling protozoa: Entamoeba, trichomonads, and Giardia. In: Jensen JB (ed.). *In vitro* Cultivation of Protozoan Parasites. Boca Raton, Fla, CRC Press, pp. 65–109 (1983)
5. Harison,T.R.: Principles of Internal Medicine. McGraw-Hill Book Company. New York (1987)
6. Hiemstra,I., Van Bel,F. Berger,H.M.: Can *T. vaginalis* cause pneumonia in newborn babies? Br Med J **289**, 355–356 (1984)
7. Johnson,G., Trussel,R.W.: Proc Soc Exp Biol (NY) **54**, 245 (1943)
8. McLaren,L.C., Davis,L.E., Healy,G.R. et al: Isolation of *T. vaginalis* from the respiratory tract of infants with respiratory disease. Pediatrics **71**, 888–890 (1983)
9. Petrin,D., Delgaty,K., Bhatt,R. et al: Clinical and microbiological aspects of *T. vaginalis*. Clin Microbiol Rev **11**, 300–317 (1998)
10. Pusztai,Z., Szabó,L., Temesváry,B. et al: Chlamydiasis from the aspect of female infertility. [in Hungarian] Magy Nőorv L **60**, 409–415 (1997)
11. Spence,M.R., Hollander,D.H., Smith,I. et al: The clinical and laboratory diagnosis of *T. vaginalis* infection. Sex Transm Dis **7**, 168–171 (1980)
12. Szabó,L., Nyírádi,T., Godó,Gy.: Effect of vaginal infections on premature labour.[in Hungarian] Magy Nőorv L **62**, 275–280 (1999)
13. Szénási,Zs., Veréb,I., Sook,R.J., Orvos,H., Mészáros,Gy., Kovács,L., Jeszenszky,M., Bácskai,I., Nagy,E.: Epidemiological, diagnostic and clinical aspects of trichomonas. [in Hungarian] Magyar Venerológiai Archivum **3**, 215–222 (1999)
14. Wolner-Hanssen,P., Krieger,I.N., Stevens,C.E. et al: Clinical manifestations of vaginal trichomoniasis. JAMA **261**, 571–576 (1989)