Vaginal Leptothrix: From Fungi to Lactobacillosis

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A Brief History

Mycology initiated long time before bacteriology. It begun in 1665, when Robert Hooke published Micrographia, a book describing novel biology work and new observations made with microscopes. Hooke coined the term cell (similar to cells of a honeycomb) to describe biological organisms be made up of filamentous fungi [1,2]. Granting, Antonie Philips van Leeuwenhoek, a Dutch scientist is commonly known as "the Father of Microbiology", and considered to be the first microbiologist [3].

Far along, Albert S. Döderlein a German physician discovered in 1892, a vaginal bacillus that he called Döderlein. This bacillus was renamed years later Lactobacillus [4].

Original Leptothrix Descriptions

Until recent times, Leptothrix was considered to be a yeast-like fungus causing infections.

Probably, the first description of vaginal infection by Leptothrix fungus was reported by Wilkinson who, in 1840, described that organism in a vaginal discharge [5].

"Leptothrixvaginalis" was named in 1885 and was found in vagina of women and animals as long thin filaments, unsegmented, or with long segments [6].

Suggestive photographs of Leptothrix in pericardial exudate were published in 1933 by Harris [7]. They closely resemble the Leptothrix’s that are included in this editorial (Figure 1).

An additional description of Leptothrix diagnosed in patients with Trichomonas was made by Liston in 1843 and was counted in the Genus Leptothrix Kutzing [8].

Modern Outlook

In 1952, Feo and Dellette published the results of vaginal discharge examination performed in 500 African American pregnant women. They observed in 15.2% of them a filamentous strain of the bacillus of Döderlein. They described the morphology of this bacillus as similar to the ones designated as Leptotrichia (Leptothrix). The bacillus was assigned to the Lactobacillus acidophilus group because of its biochemical properties and its micro-aerophilic characteristics [9].

Notwithstanding Feo’s publication, in 1972 Von Maseela examined 73 patients with microscopically confirmed Leptothrix vaginatis-infection. He concluded his report stating that the Leptothrix-filaments he observed revealed a subtle segmentation and sporulation [10].

Opportunely, in 1994 Kaufman and Faro described Leptothrix organisms as gram-positive anaerobic rods longer than lactobacilli but shorter than Candida filaments. Additionally, they measured length in vaginal Lactobacillus and Leptothrix and reported that in healthy women the former was 5 to 15 microns, whereas the later was 40 to 75 microns [11].

More recently, Rajaratnam’s group associated vaginal lactobacillosis with Leptothrix presence: they observed long serpiginous rod like organisms in wet mount preparation as well as in Gram stained samples [12].

A review of using Pap smears to diagnose a number of microorganisms including Leptothrix vaginalis was carried out by Fitzhugh and Heller. They pointed out that the diagnosis accuracy of the Pap smear differs amongst the organisms in question. The authors also described Leptothrix, as very long, fusiform lactobacilli that may well be as long as spermatozoa [13].

Recent Findings as Regards to Leptothrix

During the last few decades several reports by various scientists regarding incidence, statistical studies and/or the presence of vaginal Leptothrix have emerged [14-18].

Additionally, Mekki reported cyto-morphological modifications and intensity of inflammation by Leptothrix in vaginal smears [19].

Moreover, Beric et al recognized the pathologic significance of Leptothrix in the female genital tract [20].

Platz-Christensen suggested very long Döderlein’s bacteriota be a risk factor for post-operative infection after first-trimester abortion [21].

Figure 1: Vaginal Lactobacillosis with the presence of Leptothrix. Fresh wet mount 200x.
Lactobacillosis

We can certainly realize the enormous progress made in the recognition of vaginal Lactobacillosis. From Weinstein who reported the presence of yeast-like fungus in the vagina to the description made by Angel of filiform microorganisms causing peculiar vaginal smear cytology in pregnancy [22,23].

More recently, we applaud the Lactobacillosis study performed by Horowitz’ group who pointed out the presence of Leptothrix associated with Lactobacillosis [24]. Moreover, the 2014 review on Lactobacillosis by Ventolini et al. addresses the unknown etiology, the prevalence, the differential diagnosis and the most effective treatments to be used [25].

Conclusions

Vaginal Leptothrix journey, from fungi to Lactobacillosis is a clear example on how medical science and discovery work hand to hand. We are still facing the challenge of figuring out what role Leptothrix play in the vaginal ecosystem.

References

1. Robert Hooke (1667) Micrographia: Or Some Physiological Descriptions of Minute Bodies Made by Magnifying Glasses, with Observations and Inquiries Thereupon. Courier Dover Publications, USA.