

ZPT and essential oil of verveine to radically abolish malodour in a girl from Djibouti who had undergone to pharaonic circumcision and suffered from a Papouli-Roulides' vaginal aspergillosis

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ABSTRACT

We have studied a new strategy to combat a serious vaginal aspergillosis that is common in girls cases from countries like Djibouti, Eritrea, Ethiopia, Somalia, and Sudan etc.; in which Type III FGM (Female Genital Mutilation) is practiced as pharaonic circumcision. It is well known that infibulation can cause chronic pain and infection, organ damage, prolonged micturition, urinary incontinence, inability to get pregnant, difficulty giving birth, obstetric fistula, and fatal bleeding. Moreover, the prolonged micturition and the urinary incontinence usually causes an unwanted characteristic odor. This is why females from those regions often have to rely on wearing long burnouses or on using fragrances based on musks, opoponax and myrrh to conceal the malodour.

Key words: Vaginal Aspergillosis; *Aspergillus protuberus*; Pharaonic circumcision; Female genital mutilation; *Lippia alba*; Aflatoxin B1

INTRODUCTION

The vast majority of vaginal fungal infections are caused by *Candida* species; however vaginitis cases caused by molds are extremely rare. *Aspergillus protuberus* was previously known as a member of *Aspergillus* section *Versicolores* which can cause opportunistic infections in immunocompromised patients, however it has recently been described as a separate species. Although the members of *Aspergillus* section *Versicolores* have rarely been isolated in cases of pulmonary infections, eye infections, otomycosis, osteomyelitis and onychomycoses, to the best of our knowledge, there is no published case of vaginal infection caused by *A. protuberus*, even though this type of microbial infection does exist [1]. In this modest contribution, we have tried to propose and discuss a strange first case

of persistent vaginitis of an immunocompetent patient caused by *A. protuberus*.

CASE REPORT

A 23-year-old female patient coming from Djibouti and who underwent an infibulation at age of 14. The biggest issue for the patient was the unpleasant scent coming from the pelvic area (like spoiled cheese or rotten melon). Her symptoms had been persistent despite miconazole nitrate and clotrimazole therapies for probable candidal vaginitis. Fungal structures such as branched, septate hyphae together with the conidial forms were seen in microscopic examination as in the cervical smear. Thereafter a vaginal discharge sample was taken for microbiological evaluation and similar characteristics of fungal structures were observed in

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the microscopic examination and cervical smear as well. Then, the preliminary result was reported as *Aspergillus* spp. At the same time, the sample was plated on Sabouraud Dextrose Agar (SDA) in duplicate and incubated at room temperature and at 37°C. After 5 days white, powdery and pure-looking fungal colonies were observed in SDA which was incubated at room temperature, while the other medium remained sterile. The strain was grown for 7 days on malt extract agar and then ITS regions were amplified and sequenced from isolated DNA for genomic characterization. The obtained sequences were determined as *Aspergillus Versicolor*.

As a result of deeper changes in classification of fungi, analysis of partial β -tubulin and calmodulin sequences have also been used to obtain a detailed and precise characterization. Eventually the strain has been identified as *A. protuberus* which is a recently accepted species distinct from *Aspergillus* section *Versicolores*. As the patient could be contacted after the preliminary report, detailed demographical information, probable origin and route of transmission of the agent and prognosis of infection remained obscure. In conclusion, the first case of vaginitis caused by *A. protuberus* was described in this report.

It is worth mentioning that alcohol-based skin antiseptics products have a long history of safety and efficacy [2-3]. However, alcohol alone lacks the required antimicrobial persistence to provide for the sustained periods of skin antiseptics desired in the clinical environment. Therefore, alcohol-based products must have a preservative agent such as iodine/iodophor compounds, chlorhexidine gluconate, or zinc pyrithione to extend its antimicrobial effects.

The thrust of the effort was to examine the characteristics of the lesser-known zinc pyrithione and to evaluate its utility as a preservative in the formulation of alcohol-based products for skin antiseptics and in this specific and peculiar case, vaginitis evoked by *Aspergillus* spp. due to infibulation.

This work includes a literature review of current zinc pyrithione applications in drugs and cosmetics, its history and a safety and toxicity evaluation, consideration of the proposed mechanisms of antimicrobial action, in vitro and in vivo efficacy data, and a discussion of the mechanisms that confer the desired antimicrobial persistence.

The natural antibiotic aspergillic acid contains a cyclic hydroxamic acid functional group in a pyrazine nucleus. Attempts to develop synthetic methods for introducing heterocyclic rings into the hydroxamic acid group present in aspergillic acid led in 1950 to the preparation for N-hydroxy-2-pyridinethione (HPT). The synthesis was achieved by conversion of a 2-pyridyl ether to its N-oxide, followed by dealkylation [4,5]. The reaction of 2-bromopyridine-N-oxide with thiourea forms 2-pyridyl-N-oxide-isothiourea hydrobromide, and followed by treatment with aqueous sodium carbonate, it produces N-hydroxy-2-pyridinethione (HPT). This compound was shown to have potent antimicrobial properties; in vitro, 1 μ g HPT would inhibit *Staphylococcus aureus*. Thus this synthetic analog was 30 times more potent as an antimicrobial than the native aspergillic acid. Later HPT was shown to have extremely potent activity against gram-positive and gram-negative bacterial species as well as strong activity against yeasts and fungi: *Aspergillus*, *Trichophyton* species, *Candida albicans*, and *Cryptococcus* species.

The second concern to be examined was the concealing of the bad smell and so the inclusion in formula of an antibacterial essential oil which smells nice. Some Indian Researchers [4] disclosed the usage of *Lippia alba* essential oil as a perfect antagonist of the aflatoxin B1 caused by *Aspergillus* spp. in the vaginal area. This flowering plant belongs to a species in the legume family and is mainly cultivated in East, Southeast and South Asia. *Lippia alba* (verveine) is also known as lamerik in Martinica, twa-tass in Occidental India, mastranto in Panama, poleo in Venezuela or in Guyana, erva-cidreira in Brazil, pitiona in Mexico, prontoalivio in Colombia, juanilama in Costa Rica, salvia morada in Argentina, and melissa in Europe.

Our Patient from Djibouti expressed her consent to experiment in order to try to alleviate the itch and the malodour of her pelvic area. The cosmetic combination of the intimate mousse was constructed in Table 1.

This cosmetic foaming mousse was to be rinsed for some minutes every time before urinating (not too often since infibulation causes water retention in women).

DISCUSSION

FGM is considered a violation of human rights. According to current knowledge, it does not bring any

Table 1: Table featuring substances and quantities of the intimate mousse

Substance	Quantity
Zinc pyrithione	1.4
Verveine ess. Oil	0.8
Glyceryl oleate	14
Cocoamide DEA	11
Cocoamidopropyl betaine	8
Aqua q.s.	100

positive therapeutic effects, but it is usually associated with severe short and long-term complications. According to WHO statistics, approximately 3 million girls worldwide are likely to undergo FGM each year [6]. These are approximate numbers due to the type of isolation policy of the country where FGM is practised on the largest scale. The statistics obtained are actually based on the population that manages to leave the previously mentioned isolative countries.

FGM is usually divided into 4 types. Type I (clitorodectomy) includes every procedure that totally removes the clitoris and/or the prepuce. Type II (excision), is the partial/total removal of the labia minora with or without partial/total removal of the clitoris. Type III (Infibulation) is defined as the narrowing of the vaginal orifice with the sealing of the perineum by cutting and repositioning the labia minora and labia majora with or without the excision of the clitoris. Type IV includes all other harmful procedures done without medical purpose to the female genitals [7].

Most short-term complications are infections including staphylococcus infections and urinary tract infections, excessive and uncontrollable pain, and haemorrhaging. What is more, infections such as Chlamydia trachomatis, Clostridium tetani, herpes simplex virus 2 HSV-2 and human immunodeficiency virus HIV are significantly more common among women who underwent FGM type III compared to other categories. One of the most common long-term complications is development of keloid scar tissue over the area that has been cut. Life-long recurrent urinary tract infections are common as well. The rate of birth complications is much higher for circumcised women so they cut in the perineum area so that the baby can be delivered safely. Other

side effects include malodour, dysuria, cysts, voiding disorders, and possible infertility.

Our experiment was aimed at reducing one of the possibly minor complications that our patient could potentially suffer from. Nevertheless, without our intervention, the above symptom could accompany the patient for most of her life. This would have a highly probable impact on the patient's quality of life, including her intimate life. All this would ultimately contribute to problems with assimilation with society and psychopathological mechanisms that increase the risk of anxiety, major recurrent depressive disorder, and ultimately suicidal tendencies.

CONCLUSION

It was noticed that after 11 days of application of the foaming mousse the malodour began to disappear. After 17 days patient from Djibouti declared not to feel any itch or pain anymore.

REFERENCES

1. Borsa BA, Ozgun G, Houbraken J, Okmen F. The first case of persistent vaginitis due to *Aspergillus protuberus* in an immunocompetent patient *Mikrobiyol Bull.* 2015;49:130-4.
2. Guthery E, Seal LA, Anderson EL. Zinc pyrithione in alcohol-based products for skin antiseptics: persistence of antimicrobial effects. *Am J Infect Control.* 2005;33:15-22.
3. Seal L., Paul-Cheadle D. A systems approach to preoperative surgical patient skin preparation. *Am J Infect Control.* 2004;32:57-62.
4. Pandey AK, Sonker N, Singh P. Efficacy of Some Essential Oils Against *Aspergillus flavus* with Special Reference to *Lippia alba* Oil an Inhibitor of Fungal Proliferation and Aflatoxin B1 Production in Green Gram Seeds during Storage. *J Food Sci.* 2016;81:M928-34.
5. Krishnanand G, Monappa V, Rao ACK. Primary cutaneous NK/T cell lymphoma-nasal type with cutaneous aspergillosis. A case report and literature review. *Our Dermatol Online.* 2013;4:335-8.
6. Mishori R, Warren N, Reingold R. Female Genital Mutilation or Cutting. *Am Fam Physician.* 2018;97:49-52.
7. Khosla R, Banerjee J, Chou D, Say L, Fried ST. Gender equality and human rights approaches to female genital mutilation: a review of international human rights norms and standards. *Reprod Health.* 2017;14:59.

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