Old Wine in a New Bottle-Focus on Candidial Vaccine

Prabhusaran N1*, Ganeshkumar A1,2, Pramila M1,3, Revathi R4 and Rajaram R2

1Department of Microbiology, Trichy SRM Medical College Hospital and Research Centre, India
2Department of Marine Sciences, Bharathidasan University, India
3Department of Biotechnology, Nehru Memorial College, India
4Department of Obstetrics & Gynaecology, Trichy SRM Medical College Hospital and Research Centre, India

*Corresponding author: Prabhusaran N, Department of Microbiology, Trichy SRM Medical College Hospital and Research Centre, India, Email: leptoprabhus@gmail.com

Submission: March 28, 2018; Published: April 27, 2018

Abstract

Vaginal Candidias or vaginal candidial infection is one of the most common infections in reproductive age and older age woman. It is usually managed by first line treatment of azoles and other antifungal antibiotics through oral, tropical and intra-vaginal preparations. Followed by if recurrence observed, intravenous preparation also administrated. During the past decades, the incidence of vaginal candidiasis and recurrent vaginal Candidiasis was frequently occurred due to poor/ mis-diagnosis, development of drug resistance, infection by non albicans species, phenotypic and genetic adaptation towards the drug Candida. Even though, there are enormous new antifungal antibiotics was introduced but the incidence of drug resistance was more concern. So in order to overcome this circumstance the researchers are tend to make a new Candida to prevent the Candida infection. In this review we are trying to achieve the importance Candida vaccine thus should provide a better option for candidiasis.

Vaginal Architecture and Candidias

Vaginal stratified squamous epithelial cells are the outer most self defence agent against several infectious agents [1]. It was procured the host immune system acted as barrier against sexually transmitted diseases to opportunistic infections. Vagina showing unique micro environment which facilitates the attachment of probiotic organism like Lactobacillus [2]. Because of the loosely bounded cells with enriched glycogen afford to cross the endogenous organisms around the layer [3]. However, due to the production of several antimicrobial peptide and other immune molecules primarily protects the vaginal environment [4]. In most cases, a simple columnar epithelium of endocervix is the major site of infection. During the course of normal phase Candida living like a commensal organism, but when it becomes uncontrolled growth possible to be a pathogenic organism. Formally Candida albicans alone consider as a causative agent of RVVC (Recurrent vulvovaginal candidiasis), but the detailed investigations evidenced the uncommon non albicans species to be the part of the chronicity of the infections [5,6].

Risk Factors of Recurrent Vulvovaginal Candidiasis (RVVC)

Candida albicans and non albicans species are present in lower reproductive tract of healthy women with asymptomatic manner. The potential risks of vaginal candidiasis are majorly associated with excessive carbohydrate source such as uncontrolled diabetes, hormonal therapy leading to formation of glycogen. Followed by disturbance of vaginal epithelial architecture by vaginal douching, improper usages of vaginal lubricants, frequent sexual intercourse and sexual mediated transformation [7,8]. Most importantly, recurrent and un-prescribed usage of antibiotics, immune-suppressive agents reduces the lactobacilli count which overlooked to regulate the Candida homeostasis leading to candidial overgrowth [9].

Virulence Factors of RVVC

Candida species produces wide range of virulence factors that includes production of adhesion molecules (Als1p, Als5p) [10], secretion of several classes of proteolytic enzymes (secreted aspartyl-proteinase (Sap 1 to 10) [11,12], heat shock protein, biofilm formation, drug resistance, germ tube formation (Hwp1p, hyphal- and germ tube-specific gene [13,14] and morphological transition. Candida cells were grown like oval in shape, in some condition the yeast form was transited in to hyphae form. This form of Candida was more pathogenic than the yeast form; also it was linked with other virulence factors like Sap and Als proteins [15]. During the infection, the adhesion molecules initiates the adhesion of candidial cells to the host epithelial cells, vigorous proliferation
takes place leads to abnormal and obnoxious growth due to the expression of Hwp1 protein [3,10].

**Therapeutic Failure of RVVC**

Till 19th century, several antifungal antibiotics were introduced for candidal prophylaxis and their broader classifications of antifungal are azoles, polyenes, echinocandins, allylamine and pyrimidines. These target the candidal cell wall and cell membrane, DNA/ RNA synthesis and arrest the function microtubules [16]. In the past two decades, the incidence of RVVC were enormously increased because of increased and unrestricted usages of azoles [17] and other antifungal antibiotics, rises the incident of disease prevalence through development of drug resistant to C. albicans and other non albicans species [18]. In some cases, a group of chaperones reported from C. albicans showing reduced accessibility of drug Candida. Among them Hsp90 regulates drug resistance, morphogenesis, bio-film formation and virulence [15].

**Development of New Strategies for Candida Vaccination**

The family of Sap proteins are the major concern of vaginal candidiasis and RVVC, because of increased invasion through the disturbance of vaginal architecture. Among them Sap 1, 2 and 3 having the antigenic interaction with better immune response against C. albicans and non albicans species [12,19]. The excellent immunogenicity modulation of Sap protein family was determined as one among the important factor of developing anti-candidial vaccine. From the last decade, enormous studies highlighted the importance of candidal vaccine in order to prevent the pathogenicity and virulence of the RVVC. The detailed investigations of two different vaccines against C. albicans are

a. Protein that belonging to Sap (Sap 2) family [20,21] and
b. Als (Als 9) proteins have been completed phase I trials and approved for RVVC treatment.

Recently, the data demonstrated the importance of Sap 2 against mucosal infections of C. albicans with some formulation by virosomes in order to develop better vaccine for candidiasis [21].

**Conclusion**

Vaccination is one of the best methods of elimination of pathogenesis of several infectious diseases. But in the account of candidiasis, our own immune system recognised Candida as commensal organism, so it falls to develop immunogenicity towards the candidal infection. Also there are several controversies were raised against candidial vaccine, because of lower specificity, higher cost and others. However, detailed investigations by the expertise peoples will be the option to eradicate the controversies over the candidal vaccination.

**References**


How to cite this article: Prabhusaran N, Ganeshkumar A, Pramila M, Revathi R, Rajaram R.Old Wine in a New Bottle-Focus on Candidial Vaccine. Invest Gynecol Res Women's Health. 2(2). IGRWH.000528.2018. DOI: 10.31031/IGRWH.2018.02.000528