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RESEARCH ARTICLE

SCREENING OF INFERTILE FEMALES FOR VAGINAL CANDIDIASIS.

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Abstract

Introduction: Infertility is a major public health problem across worldwide and in India. As per WHO, 60 to 80 million couples worldwide currently suffer from infertility. The role of female reproductive tract infection, symptomatic or asymptomatic, is well recognized. Studies reveal that *Candida albicans* have sperm-immobilizing property which might lead to infertility. Keeping this in mind the present study was done. **Aim:** To screen infertile females for vaginal candidiasis. **Material & Methods:** 100 infertile women were screened for vaginal candidiasis. High Vaginal swab collected from them were processed for fungal culture using conventional methods. Anti-Fungal susceptibility testing was done for all the isolates of *Candida* spp. as per guidelines. **Results:** 17% of the patients suffered from vaginal candidiasis. *Candida albicans* followed by *Candida tropicalis* were the most common isolates. None of the isolates were resistant to Amphotericin B and Nystatin while maximum resistance was shown for Fluconazole. **Conclusion:** There was more predominance of non albicans *Candida* in the study thereby showing a change in causative agent of vaginal candidiasis. Moreover since studies show sperm-immobilising property of *Candida* spp., infertile women should be routinely screened for vaginal candidiasis.

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Introduction:-

Infertility is a major public health problem across worldwide and in India. World Health Organization (WHO) defines infertility as “the inability of a sexually active, non-conceiving couple to achieve pregnancy in one year” (WHO laboratory manual for the examination and processing of human semen, 2010). As per WHO, 60 to 80 million couples worldwide currently suffer from infertility (Infecundity, infertility and childlessness in developing countries. Demographic and Health Surveys (DHS) Comparative reports No. 9, 2004).

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Besides other causes of female infertility, the role of female reproductive tract infection is well recognized. Infections may be in the form of Pelvic Inflammatory diseases (PID) or lower genital tract infection, either of which can be asymptomatic or symptomatic. These infections need to be diagnosed and treated properly to set the patient free from the grasp of infertility. Candida infection plays an important role in this regard. As per studies, *Candida albicans* have sperm-immobilizing property (Harpreet & Vijay, 2015; and Tian et al., 2007). When the sperm-immobilizing strains of *Candida albicans* were intravaginally inoculated into female mice, it showed 100% decrease in fertility in all groups as compared with control mice. Moreover, since no clinical or histopathological changes were observed in the reproductive organs, colonization of the genital tract with sperm-impairing micro-organisms could be the reason behind female infertility (Harpreet & Vijay, 2015). As per Mathur et al. (Mathur et al., 1980), patients with chronic vaginal candidiasis of at least 5 years duration showed high titres of auto-antibodies to ovary which may be due to the presence of one or more cross-reactive antigens on ovarian follicle and *Candida* spp. Thus chronic vaginal candidiasis may be associated with decreased ovarian function, thereby affecting the fertility outcome.

In view of this, our study was carried out to evaluate vaginal candidiasis in infertile females.

Material and Methods:-

It was a cross sectional study carried out for a period of one year (2014-2015) in a Tertiary care teaching hospital in Western India. The study was approved by the institutional ethics committee. A total of 100 married reproductive age group females (18 – 49 years) attending infertility clinic, with the exception of those receiving antibiotic and antifungal therapy in previous one month, were included in the study. A questionnaire covering demographic data, menstrual history, contraceptive use, recent antibiotic use, medical history & history of vaginitis and infertility was completed for each of the participants. After taking consent, High Vaginal swab (HVS) was collected under speculum examination using sterile swab.

KOH (10%) mount was prepared to detect presence of *Candida*. A gram stained smear was examined for the composition of bacterial morphology and presence of yeasts and leukocytes. All the specimens were inoculated on Sabouraud Dextrose Agar (SDA) which was incubated at 37°C. In case of growth, discrete colonies were picked and processed further for identification using conventional methods like Germ Tube Test (GTT), Chrome agar, Corn Meal Morphology.

Antifungal susceptibility testing was done by disc diffusion method as per guidelines (NCCLS May 2004). Antifungal agents used for susceptibility testing (HIMEDIA Hexa Antimyc-01) are mentioned in Table 1. Antifungal susceptibility pattern was interpreted as per NCCLS (NCCLS May 2004) and manufacturer's guidelines.

Table 1:- Antifungals used for susceptibility testing

Sr. No.	Antifungal agent	Dose
1.	Fluconazole	25 µg
2.	Ketoconazole	10 µg
3.	Itraconazole	10 µg
4.	Nystatin	100 units
5.	Amphotericin B	100 units
6.	Clotrimazole	10 µg

Results:-

The various findings of our study were analysed as follows. Out of 100 patients, *Candida* spp. was isolated from 17 of them. Among the fungal isolates of our study, *Candida albicans* (35.3%) was the most predominant fungal isolate followed by *Candida tropicalis* (29.4%). The distribution of various *Candida* spp. was as shown in Fig 1. The resistance pattern of the isolates was as shown in Fig 2.

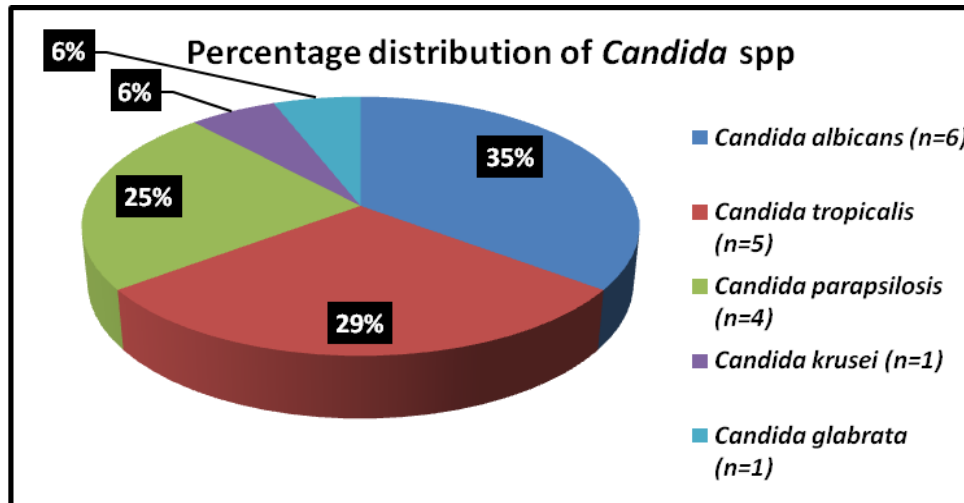
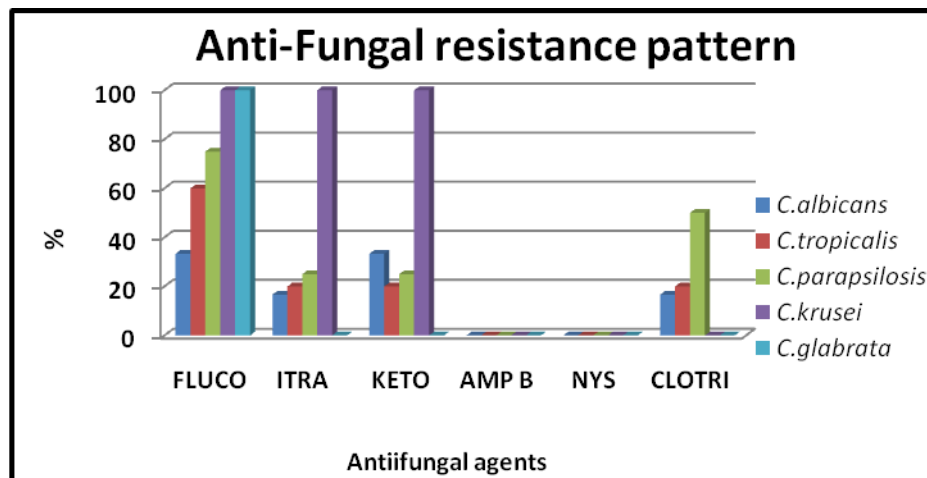
Fig 1:- % distribution of *Candida* spp

Fig 2:- Anti-fungal resistance pattern

Discussion:-

In our study, *Candida* spp was isolated from 17% of the cases which is bit higher than that reported by Rodriguez et al. (Rodriguez et al., 2001). Ghiasi et al. (Ghiasi et al., 2014) and Gupta et al. (Gupta et al., 2014) had shown prevalence of *Candida* spp. as low as 1.4% and 5.9% respectively. Unlike our study, other studies showed prevalence of *Candida* spp. as high as 22%, 25%, 30.8% and 43.5% (Saleh, 2010; Okonofua et al., 1995; Paul et al., 2011; Ogiogwa et al., 2012).

Candida albicans (35.3%) was the most common fungal isolate which is similar to results of the study done by Verghese et al. (Verghese et al., 2001). In our study, *Candida tropicalis* (29.4%) was the second most predominant fungal isolate, unlike Verghese et al. (Verghese et al., 2001) where the second most common isolate was *Candida glabrata*. *Candida krusei* constituted 5.9% of the fungal isolates in our study which is similar to Verghese et al. (Verghese et al., 2001).

Broadly speaking, none of *Candida* spp. in our study showed resistance to Amphotericin B and Nystatin. Maximum resistance was shown for Fluconazole followed by Ketoconazole, Itraconazole and Clotrimazole. Unlike our study, Fluconazole was the drug of choice for vaginal candidiasis in another study (Khan & Rakshanda, 2010). As per Gandhi et al. (Gandhi et al., 2015), antifungal susceptibility pattern showed that *Candida* isolates were more sensitive to Amphotericin-B (98.36%) and Nystatin (100%), compared to that of Clotrimazole (79.5%) and Azoles like Fluconazole (79%), Itraconazole (52%) and Ketoconazole (76%). As per Verghese et al. (Verghese et al., 2001),

16.7% *Candida* strains showed resistance to Fluconazole, 45.23% of the strains showed resistance to Itraconazole, 9.5% strains showed resistance to Nystatin while there was no resistance to Amphotericin B.

A comparative analysis of the resistance pattern of *Candida* species isolated in our study, for Fluconazole, Itraconazole, Ketoconazole and Clotrimazole are given Table 2-5 respectively.

Table 2:- Comparison of Resistance pattern (%) for **Fluconazole**

<i>Candida</i> species	Our study	Gandhi et al., 2015	Adeshji et al., 2010	Sachin & Santosh, 2013	Salehei et al., 2012
<i>C. albicans</i>	33.33	17	84.6	-	81.13
<i>C. tropicalis</i>	60	17	66.7	29.5	100
<i>C. parapsilosis</i>	75	0	-	10	-
<i>C. krusei</i>	100	33	100	18.8	100
<i>C. glabrata</i>	100	15.70	50	27.3	100

Table 3:- Comparison of Resistance pattern (%) for **Itraconazole**

<i>Candida</i> species	Our study	Gandhi et al., 2015	Sachin & Santosh, 2013	Salehei et al., 2012
<i>C. albicans</i>	16.67	13.50	-	15.09
<i>C. tropicalis</i>	20	8.34	9.8	0
<i>C. parapsilosis</i>	25	16.66	10	-
<i>C. krusei</i>	100	33.33	21.9	0
<i>C. glabrata</i>	0	15.78	12.7	0

Table 4:- Comparison of Resistance pattern (%) for **Ketoconazole**

<i>Candida</i> species	Our study	Gandhi et al., 2015	Sachin & Santosh, 2013	Salehei et al., 2012
<i>C. albicans</i>	33.33	11	-	43.39
<i>C. tropicalis</i>	20	17	39.4	25
<i>C. parapsilosis</i>	25	0	10	-
<i>C. krusei</i>	100	33.5	25	0
<i>C. glabrata</i>	0	5	13.7	12.25

Table 5:- Comparison of Resistance pattern (%) for **Clotrimazole**

<i>Candida</i> species	Our study	Gandhi et al., 2015	Ajitha & Maimoona, 2014	Salehei et al., 2012
<i>C. albicans</i>	16.67	9	20	1.88
<i>C. tropicalis</i>	20	17	45.5	50
<i>C. parapsilosis</i>	50	0	50	-
<i>C. krusei</i>	0	67	-	0
<i>C. glabrata</i>	0	5	33.3	0

Conclusion:-

There was more predominance of non albicans *Candida* in our study thereby showing a change in causative agent of vaginal candidiasis. *Candida* spp. isolated in our study were least resistant to Amphotericin B and Nystatin while showed maximum resistance to Fluconazole. As per reports from other studies, *Candida albicans* plays an important role in female infertility; hence infertile females should be routinely screened for vaginal candidiasis.

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