



## PREVALENCE AND RISK FACTORS OF CANDIDA IN CASES OF CANDIDEMIA IN A TERTIARY CARE HOSPITAL

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### ABSTRACT

Invasive infections caused by *Candida* spp. are an important problem in immunocompromised patients. There is scarce data on the epidemiology of blood stream candidiasis with us. This study evaluates the risk factors associated with candidemia, among patients admitted to three tertiary, private hospitals, in punjab. We conducted a case-control, retrospective study to compare patients with diagnosis of candidemia in a tertiary hospitals in punjab. The groups were compared for the main known risk factors for candidemia . A total of 304 patients were screened in the study period till yet. Out of these total patients, 30 showed positive cultures in blood out of these 20 were male and 10 were female .

Most common risk factor was use of intravenous canulae(63%) followed by prolonged use of antibiotics(35%) and immunosuppression(23%) as 25 patients out of 30 were form Emergency & Emergency is the most venerable and important area in hospital as serious cases are admitted mostly & they require IV line, they remain on antibiotics for long time, invasive procedures are performed on them & and as they are bed ridden with some ailments their immunity is also immunocompromised Distribution of candida species among the positive patients showed candida albicans(78%).candida tropicalis(9%) and candida parapsilosis(13%)

**Conclusion:** There is increase in the rate of incidence of blood stream infection caused by candida .Continued & careful surveillance of candidemia will be important to track trends of this serious infection and to document changes in its epidemiological features. Proper antibiotic policies,infection control policies will help to control the noso- comial infections in areas of hospital which requirespecial attention like emergency, ICU etc..

**Keywords:** Invasive candidiasis, Risk factors, Bacteremia.

### INTRODUCTION

*Candida* species are the most common cause of fungal infections worldwide.They can cause a great variety of infections, including simple, mucocutaneous processes, but they also provoke severe, invasive infections that can involve virtually any organ. Blood stream infections by *Candida* are increasingly common, and often are associated with high mortality rates. <sup>1,2</sup> Recently, we have seen an important increment in the frequency of non-albicans species of *Candida*, such as *C. glabrata*, *C. krusei*, *C. tropicalis*, and *C. parapsilosis*, as causes of fungemia. <sup>3,4</sup>

Nowadays, *Candida* spp. is known as the 4<sup>th</sup> most frequently isolated pathogen from the blood stream, among hospitalized patients in North American hospitals. <sup>5,6</sup>

The reasons for this increase in fungal infections are multifactorial: better clinical evaluation, and diagnosis, greater survival for patients with malignancies, chronic diseases, increasing number of transplants, complex surgical procedures, catheters, implants and use of wide spectrum antibiotics <sup>7</sup>. We designed this study to evaluate the risk factors and outcomes of patients presenting with blood stream *Candida* infections in a private hospital. As candidemia rank fourth as the most common causes of nosocomial blood stream infection in the united states.<sup>5,6,8,9</sup>

The most important factors for candidemia are intravascular catheters;intensive cancer chemotherapy, broad spectrum antimicrobial therapy, invasive medical devices, organ transplantation, HIV & expanding aging population. Candidemia is not only associated with mortality of about 30% to 40% but also extends the duration of hospital stay & also increase the cost for medical care. Careful epidemiologic studies have identified intravascular catheters, broadspectrum antibiotictherapy, mucosalcolonization, neutropenia, previous surgical procedures particularly complicated abdominal surgery), total parenteral nutrition and concomitant bacteremia as significant risk factors for invasive *Candida* infection. <sup>10,11,12</sup>

### AIMS AND OBJECTIVES

To study the changes in the prevalence of Candidemia in a tertiary care hospital and to assess the risk factor and other predisposing factors.

### MATERIALS AND METHODS

This study was conducted at AdeshMedical College Bathinda, a 750 beaded teaching hospital,Nonsystematic review of patients admitted in hospital with septicemia was done. On the basis of the guidelines of the Centers for Disease Control and Prevention and the Infectious Diseases Society of America (IDSA)<sup>14,15,16</sup> candidemia was defined as the isolation of a *Candida* spp. from at least 1 blood culture in the presence of signs and symptoms of systemic fungal infection. A case was considered likely to be catheter-related when the same *Candida* species was isolated both from a peripheral blood culture and from the catheter tip,yielding >15 colony-forming units by using the semiquantitative roll-plate culture method in the absenceof other sources of candidemia, or from a quantitative blood culture that was collected through a centralvenous catheter, yielding 5-fold more colony forming units per mm<sup>3</sup> than were yielded in a simultaneous culture of blood collected from a peripheral vein. All in- patientst who had shown signs and symptoms of nosocomial blood stream infection were screened for candidial infection.The data is colleted during april2008 to April 2010. This period is divided into two different time span i.e.april 2008-2009 & may 2009and april 2010.

During the first part a total of 188 blood culture samples were analysed. During the 2 half(period of may 2009-april 2010)total of 116blood culture samples were analysed .out of these patients 30 patients showed positivity. Demographic andclinical data was recorded on special form which include age,sex,diagnosis,treatment history,catheter status and any other predisposing factors. out of these 20 were male and 10 were females. Blood culture is performed using blood culture bottles containing glucose broth, they were incubated at 37 c & subcultures were done alternate day. Patients

who showed culture positive were analyzed for predisposing factors for candidemia. When necessary, germ tube analysis, morphologic analysis with cornmeal-Tween 80 agar, and differential growth testing at 35 °C and 43 °C were performed for confirmation. The intravascular segments (catheter tips) of all central venous catheters that were used in the patient group were cultured by using the semiquantitative rollplate method described by Maki et al.<sup>13</sup>

## RESULTS

A total of 304 patients were screened in the study period till yet. Among these, 188 patients were screened during the period April 2008-April 2009 and 116 patients were screened during May 2009-April 2010. Out of these total patients, 30 showed positive cultures in blood out of these 20 were male and 10 were female as shown in (Table 2). The risk factor was analyzed as shown in (Table 1).

**Table 1: Underlying condition or risk factor**

Risk factors	No. of cases	Percentage (%)
IV canula	19	63
Prolonged antibiotic	11	35
Immunosuppression	7	7
Pneumonia	2	6.6
Surgery	8	27
Ventilation	2	6.6
Fracture	1	3.33
Organ failure	2	6.6
Parenteral nutrition	9	30

**Table 2**

Gender	Male	Female
Total 304(30)	20	10

Most common risk factor was use of intravenous canulae (63%) followed by prolonged

use of antibiotics (35%) and immunosuppression (23%) as 25 patients out of 30 were from Emergency & Emergency is the most vulnerable and important area in hospital as serious cases are admitted mostly & they require IV line, they remain on antibiotics for long time, invasive procedures are performed on them & as they are bed ridden with some ailments their immunity is also immunocompromised.

Distribution of candida species among the positive patients showed candida albicans (78%), candida tropicalis (9%) and candida parapsilosis (13%) and in 2<sup>nd</sup> half only slight variation was seen (Table 3).

**Table 3: Percentage (%)**

Candida albicans	24	78
Candida tropicalis	2	9
Candida parapsilosis	4	13

## DISCUSSION

The present study emphasizes the importance of candidemia among hospitalized patients. Candidemia is not only associated with a significant mortality but also extends the duration of hospital stay and increases the cost of medical care.

Patients with candidemia usually present with acute septic syndrome that is indistinguishable from bacterium, but they may also exhibit a more indolent course manifested by fever of unknown origin. Major risk factors for candidemia include intravascular catheters (63%), broad-spectrum antibiotics (35%) and immunosuppression (23%). The present study highlights the importance of candidemia among patients of high risk groups such as, patients with IV canula parenteral antibiotics, malignancy, surgery etc. The predisposing factors and underlying diseases observed in this study are comparable to those observed by others.<sup>17,18</sup>

Our result showed candida albicans as most common cause (78%) and there was no shift towards NAC. This is in contrast to the study done in United States and other European countries.<sup>15,19</sup>

In sex incidence, the overall prevalence in total of 30 patients 20 were male and 10 were female but in case of candidemia there is sex predominance on either side as male to female ratio was 50%. This is different from reports done previously.<sup>20,21</sup>

## CONCLUSION

The present study is showing the increase in the rate of incidence of blood stream infection caused by candida this is true with the present trends. Continued & careful surveillance of candidemia will be important to track trends of this serious infection and to document changes in its epidemiological features. Our set up being a new set up our data will serve as a baseline data for the epidemiologist for further study on this topic but proper antibiotic policies, infection control policies will help to control the nosocomial infections in areas of hospital which require attention like emergency, ICU etc.

## REFERENCES

- Asmunds Dottir L.R., Erlends Dottir H., Gott Fredsson M. Increasing incidence of Candidemia: Results from a 20 - Year Nationwide study in Iceland. J Clin Microbiol 2002;40:3489-92
- Wise G.J., Silver D.A. Fungal Infections of the Genitourinary System. J Urol 1993; 149:1377-88.
- Fraser V.J., Jones M., Dunkel J., et al. Candidemia in Tertiary care Hospital: Epidemiology, Risk Factors and Predictors of mortality. Clin Infect Dis 1992; 15:414-21.
- Girmenia C., Martiwo P. Fluconazol and the Changing Epidemiology of candidemia. Clin Infect Dis 1998;27:232-4.
- Fridkin S.K., Jarvis W.R. Epidemiology of Nosocomial Fungal Infections. Clin Microbiol Rev 1996;9:499-511.
- Wey S.B., Mori M., Pfaller M.A., et al. Hospital-Acquired Candidemia. The Attributable Mortality and Excess Length of Stay. Archives of Internal Medicine 1998; 48:2642-5.
- Colombo A.L., Nucci M., Salomão R., et al. High Rate of Non-Albicans Candidemia in Brazilian Tertiary Care Hospitals. Diagnostic Microbiology and Infectious Diseases 1999;34:281
- Rangel-Frausto MS, Wiblin T, Blumberg HM, Saiman L, Patterson J, Rinaldi M, et al. National epidemiology of mycoses survey Variations in rates of blood stream infections due to candida species in seven surgical intensive care units and six neonatal intensive care units. Clin infect Dis 1999;29:253-8
- Microbiology of systemic fungal infections; Chakrabati A, Shiv prakash MR.
- David R. Snyderman: shifting patterns in the epidemiology of nosocomial candida infections. Chest journal, May 2003, vol 123 no. 5, suppl 5005-5035
- Abi-Said, Anaissie, Uzun, O, Rraad I, The epidemiology of haematogenous candidiasis caused by different candida spp. Clinical Infectious disease 1997;24:1122-8
- Koneman, Allen, Janda, Winn textbook of diagnostic Microbiology, 5<sup>th</sup> edition 3. Pfaller MA Nosocomial candidiasis Emerging species reservoir and modes of transmission. Clin infect dis 1996;22:89-94
- Maki DG, Weise CE, Sarafin HW. A semiquantitative culture method for identifying intravenous catheter related infection. New England J Med. 1977;296:1305-1309.
- Pearson ML; Hospital Infection Control Practices Advisory Committee. Surveillance System. Secular trends in the epidemiology of nosocomial fungal infections in the United States. Related infections. Infect Control Hosp Epidemiol. J Infect Dis. 1993; 167:1247-1251. 1996;17:438-473.
- Kao AS, Brandt ME, Pruitt WR, et al. The epidemiology of Mermel LA, Farr BM, Sherertz RJ, et al. Guidelines for the candidemia in 2 United States cities: results of a population-based management of intravascular catheter-related infection-based active surveillance. Clin Infect Dis. 1999; 29: Clin Infect Dis. 2001;32:1249-1272. 1164-1170.
- Bodey GP, Anaissie EJ, Edwards JE Jr. Definitions of Candidemia. CP, Martino F, De Bernardis G, et al. Rising incidence of candida infections [appendix]. Candidiasis: incidence of Candida parapsilosis fungemia in patients with Pathogenesis, clinical

- aspects, predisposing factors and differential pathogenicity of the causative of fungal infections in the 1990s. *Eur J Clin Microbiol Infect* 1993;18:407-408.
17. Bross J, Talbot GH, Maislin G, Hurwitz S, Strom BL. Risk factors of nosocomial candidemia: A case control study in adult without leukemia. *Am J Med* 1989;87:614-20
  18. Wey SB, Mori M, Pfaller MA, Woolson RF, Wenzel RP. Risk factors for hospital acquired candidemia: A matched case control study. *Arch Intern Med* 1989;149:2349-53
  19. Kao AS, Brandt ME, Pruitt WR, Conn LA, Perkins BA, Stephens DE et al. Epidemiology of candidemia in two United States cities; results of a population based active surveillance. *Clinical Infect Dis* 1999;29:1164-1170
  20. Diekema DJ, Messer SA, Breggeman AB, Coffman SI, Doern GV, Herwaldt LA. Epidemiology of candidemia 3 years: results from the emerging infectious and the epidemiology of Iowa organisms study. *J Clin Microbiol* 2002;40:1298-302
  21. Sandven P, Bevanger L, Digraanes A, Gaustad P, Haukland HH, Steinbakk M. Constant low rate of fungemia in Norway, 1991 to 1996. *J Clin Microbiol* 1998;36:3455-9.