Passive immunization with candida albicans antiproteinase as a prophylactic tool against the candidiasis

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Summary:

Background: Life threatening fungal disease is now a frequent substantial of the immunocompromised host population. Candida infection has risen throughout the era of antibiotics & immunosuppressive chemotherapy.

Aim of study: To highlight the need for alternative immunoprophylactic tool. Therefore the need to develop prophylactic or therapeutic immunoglobulin against candidiasis.

Materials & Methods: 12.5 mg/ml. of Candida albicans proteinase enzyme was injected SC into a group of five rabbits weighing 3 Kg. with complete Freund’s adjuvant. Antisera was collected from the animals after 28 days. 0.2 ml of this antisera given IV into two group of rabbits; followed by 0.1 ml of the antiserum one of those groups as control. The 2nd group challenged with 2.8*10^7 cfu/ml of actively growing C. albicans for three days. The 3rd group received only 2.8*10^7 cfu/ml of C. albicans for three days.

Results: Test rabbits, which received both antisera and C. albicans, were completely protected when examined after six weeks. No symptoms of the disease; no pathological lesions could be seen in the organs (Kidneys, liver and spleen). Culture for C. albicans from these organs were all negative. In contrast to rabbits received challenged dose of Candida; they become sick, visceral organs showed profuse microabscesses. Candida was isolated from minced organs on culture.

Conclusion: The findings draw attention to an important fact that the passive immunization can be applied to protect patients with leukemia and others immunocompromised individuals from serious infection of Candida. This discovery calls for application to open anew hope for these patients at least to diverse their suffer for sometime.

Introduction

Life threatening fungal disease is now a frequent substantial of the immunocompromised host population. Candida infection has risen throughout the era of antibiotics and immunosuppressive chemotherapy. Patients suffering from AIDS and other underlying diseases particularly lymphoma, Hodgkin’s and other leukemia have a predilection to candida infection.1,2,3

Identification of candidal vaccine must take into account the diversity of candida diseases. Antigens to be considered in this contest, are members of asparryl proteinase (SalP2) and the 65-kDa mannoprotein (MP65) antigens (4). On the other hand toxicity of Amphotericin B to mammalin cells and cyoreductly therapy undergone by cancerous and AIDS patients make the drug less active and even ineffective sometimes (5).

All these, highlight the need for alternative immunoprophylactic tool. Therefore the need to develop prophylactic or therapeutic immunoglobulin against candidiasis is a clear priority.

Materials and methods

Candida albicans species used in this work was isolated from leukaemic patient, who showed candidemia. The organism was tested by conventional methods to show typical characteristics of C. albicans according to Emmons (1970)(6).

Candida proteinase enzyme was prepared according to Odds (1988)(7).

Preparation of immune sera was done according to Methew et al. (1986)(8) rabbits with a weight of 3 Kg were injected with 12.5 mg/ml of proteinase in saline mixed with one ml of Freund’s complete adjuvant subcutaneously. This dose was repeated two weeks later. Blood was collected from injected rabbits after 28 days of the last injection. Sera were
Frequency of candidiasis raised from 20% in leukemic patients (Body 1966)(11) to 40% (Esley et al 1982) (12) and 42% (Ibrahim et al 2002) (13). Candida septicemia is an increasing encountered incidence, particularly as a terminal event to many underlying diseases, such as leukemia, neoplasia etc. (Rippon 1988)[1]. As it is shown in this work aspartyl proteinase play a major role in the pathogenicity of candida. Inoculation of candida was able to produce systemic infection in the rabbits of Group III (positive control) including microabscesses in large number in kidneys, liver and spleen. All these organs gave positive culture for the yeast.

On the other hand rabbits in group I (test group) which received anti proteinase antibodies and challenged with candida albicans i.e. protected animals remained normal and healthy throughout the period. Cultures made from minced organs and other samples were negative for the candida growth. It is obvious that the enzyme aspartyl proteinase play major role in the pathogenicity of Candida; in turn anti-aspartyl proteinase antibodies was able to block the pathogenicity of the yeast, consequently the yeast were killed in the protected animals. This clearly shows that colonization of C.albicans and it’s overgrowth has been hanged by the circulating antibodies in passively immunized animals. The evidence of that come from the fact that we failed to detect yeast cells in the body fluid and tissues of test animals, both by direct examination and culture. The finding draws attention to an important fact that the passive immunization can be applied to protect patients with leukemia and others immunocompromised individuals from serious infections of candida as previously described. This discovery calls for application to open a new hope for these patients at least to diverse their suffer for sometime.

References: