Clinical Characteristics and Mortality Risk Factors of Cryptococcal Infection among HIV-Negative Patients

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Objective: *Describe the clinical characteristics, treatment, outcomes, complications, and factors associated with mortality of cryptococcosis in HIV-negative patients.*
Material and Method: *A retrospective cohort study was conducted among HIV-negative adult patients with positive culture for Cryptococcus neoformans between 2005 and 2010.*
Results: *Forty-nine HIV-negative patients were identified with median (IQR) age of 62.5 (45.5-71.9) years of which 40.8% were male. The common underlying medical conditions were cardiovascular diseases (36.7%). The common sites of positive culture were cerebrospinal fluid/intracerebral abscess (46.9%), blood (36%), and sputum/bronchoalveolar larvage fluid (28.6%). Twenty-nine (59.2%) patients had co-infections with another organism, such as Gram-negative bacteria (24.4%), M. tuberculosis (17.8%), and Gram-positive bacteria (13.3%). The common clinical presentations were fever (67.3%), alteration of consciousness (34.7%), and headache (26.5%). Complication was detected in 61.2% such as acute kidney injury (47.0%), coma (38.8%), and shock (22.4%). The overall mortality was 51%. By multivariate logistic regression, factors associated with mortality were alteration of consciousness (adjusted OR = 6.85; 95% CI: 1.41-33.28, p = 0.017) and co-infections (adjusted OR = 5.32; 95% CI: 1.25-22.69, p = 0.024).*
Conclusion: *The mortality rate of HIV-negative patients with cryptococcosis is very high. Early recognition and treatment of cryptococcosis in HIV-negative patients are crucial and may improve the outcome.*

Keywords: *AIDS, Cryptococcus neoformans, Cryptococcosis, Cryptococcal meningitis, HIV*

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Cryptococcosis is a systemic infection caused by *Cryptococcus neoformans*, an encapsulated yeast. Cryptococcal infection occurs worldwide and has differences in geographical distribution, patient characteristics, and clinical presentations[1]. *C. neoformans* produces infection following inhalation through the respiratory tract, and then the organism disseminates hematogenously and has a propensity to localize to the central nervous system[2]. The clinical presentation varies and depends on hosts and sites of infection. *C. neoformans* causes human diseases ranging from asymptomatic pulmonary infection and meningitis to disseminated infection.

Cryptococcosis is one of the most common opportunistic infections in patients with acquired immunodeficiency syndrome (AIDS) and is associated with high morbidity and mortality[3]. Cryptococcosis is also seen in HIV-negative patients who are apparent normal hosts as well as immunocompromised hosts. The latter is, for example, patients with hematologic malignancy, organ transplantation, rheumatic disease, and those receiving immunosuppressive agents[4,5]. Defective function of lymphocytes may reflect increased susceptibility to cryptococcal infection in some patients with cryptococcosis without any other known predisposing factors[6].

The authors had reported a large series of cryptococcosis in HIV-negative patients in Thailand in the past decade and the authors found that they had a high morbidity and mortality[1]. To date, there is still little knowledge about cryptococcosis in HIV-negative patients especially in a resource-limited setting. Here the authors aim to describe the clinical characteristics, treatment, outcomes, complications, and factors associated with mortality of the disease in the larger cohort of HIV-negative patients with cryptococcosis.

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Material and Method

A retrospective cohort study was conducted at Ramathibodi Hospital (a 1,000-bed medical school hospital in Bangkok, Thailand). Patients with positive

culture for *C. neoformans* were identified from the database of the microbiology laboratory, Department of Pathology between January 2005 and December 2010. The study was reviewed and approved by the institute's review board.

Inclusion criteria were adult patients more than 15 years of age with documented negative results for anti-HIV testing. The diagnosis of cryptococcosis was based on isolation of *C. neoformans* from the normally sterile site, from operative samples of pus, or from tissue obtained from a site of focal suppuration. *C. neoformans* isolated from non-sterile site (e.g. sputum or urine) was considered to be the disease if there was evidence of infection. Disseminated infection was defined by the presence of a positive culture for *C. neoformans* from more than one site, or a positive culture for *C. neoformans* from one site (other than from a blood sample) plus a positive test for serum cryptococcal antigen. Co-infection was defined by having infection with another organism occurring within one year before or after the diagnosis of cryptococcosis.

Medical records were retrieved and reviewed. The following variables were collected; (1) baseline characteristics including age, sex, underlying condition, and current medication, (2) clinical presentations including type and site of infection, hospitalization, co-infection, and complication, (3) laboratory related data including complete blood count, blood chemistry, India ink, cryptococcal antigen and titer, and (4) treatment, length of hospital stay, and outcome.

Identification of C. neoformans

Identification of *C. neoformans* was presumptively based on the macroscopic and microscopic appearances. Confirmation biochemical test of the organism was performed by testing of urease enzyme production and various carbohydrates assimilation. Thirteen carbohydrates, which were glucose, maltose, sucrose, lactose, galactose, trehalose, melibiose, cellobiose, inositol, xylose, dulcitol, raffinose, and α-methyl-D-glucoside (MDG), were used as resources for the assimilation test. The presence of cryptococcal antigen in the blood and cerebrospinal fluid was determined by using the cryptococcal antigen latex agglutination system (CALAS; Meridian Diagnostic Inc., Cincinnati, Ohio, USA).

Statistical analysis

Categorical data were presented as a percentage. Continuous data were presented as median and interquartile range (IQR). Categorical variables were compared by using Chi-square test or Fisher's exact test. Numerical variables were compared by using Wilcoxon rank sum test. Associated factors for mortality were assessed by using logistic regression analysis. Odds ratio (OR) and its 95% confidence interval (CI) were estimated. Variables that presented $p<0.05$, were considered in a multivariate logistic regression model after assessment of multicollinearity of variance inflation factors. Variables were selected out from a multiple logistic regression model with backward stepwise selection and ones that attained a level of significance were retained in the model. A p-value <0.05 was considered statistically significant. All statistical analyses were performed using Stata statistical software version 11.0 (Stata Corp. 2009. Stata Statistical Software: Release 11. College Station, TX: StataCorp. LP).

Results

During the 6-year period, there were 49 HIV-negative patients diagnosed of cryptococcal infection with median (IQR) age of 62.5 (45.5-71.9) years and 40.8% male. Of the 47 (95.9%) patients who had underlying medical conditions, cardiovascular diseases was the most common (36.7%), followed by chronic kidney diseases (28.6%), and hematologic malignancy (28.6%). Only two patients had no underlying medical conditions before diagnosis of cryptococcosis. In addition, 27 (55.1%) patients received medications that may involve the immune system, such as steroid (36.7%), immunosuppressive drug (24.5%), and herbal medicine (20.4%). The common clinical presentations were fever (67.3%), alteration of consciousness (34.7%), and headache (26.5%). Twenty-nine (59.2%) patients had co-infection with other organisms, which were Gram-negative bacteria (24.4%), followed by *Mycobacterium tuberculosis* (17.8%), Gram-positive bacteria (13.3%), parasite (13.3%), *Nocardia* spp. (4.4%), *Candida* spp. (4.4%), and others (28.9%). The baseline characteristics and clinical presentations of 49 patients are shown in Table 1.

C. neoformans was recovered from many sites including the following; cerebrospinal fluid/intracerebral abscess 23 (46.9%) patients, blood 18 (36%) patients, sputum/bronchoalveolar larvage fluid 14 (28.6%) patients, skin and soft tissue five (10.2%) patients, urine three (6.1%) patients, bone marrow two (4.1%) patients, and one (2%) patient each for sinus, synovial fluid, and eye swab. Disseminated cryptococcal infection was defined in 31 (63.3%) patients. Serum

Table 1. Baseline characteristics and clinical presentations of 49 HIV-negative patients with cryptococcosis

Characteristics	n (%)
Median (IQR) age, years	62.5 (45.5-71.9)
Sex, n (%)	
Male	20 (40.8)
Female	29 (59.2)
Underlying conditions, n (%)*	47 (95.9)
Cardiovascular diseases**	18 (36.7)
Chronic kidney diseases	14 (28.6)
Hematologic malignancy	14 (28.6)
Autoimmune diseases	12 (24.5)
Diabetes mellitus	9 (18.4)
Pulmonary diseases	8 (16.3)
Defective CMIR or splenectomy	3 (6.1)
Organ transplantation	3 (6.1)
Medications, n (%)*	27 (55.1)
Steroid use	18 (36.7)
Immunosuppressive drugs	12 (24.5)
Herbal medicine	10 (20.4)
Chemotherapy	1 (2.0)
Clinical presentations, n (%)*	
Fever	33 (67.3)
Alteration of consciousness	17 (34.7)
Headache	13 (26.5)
Dyspnea	9 (18.4)
Cough	7 (14.3)
Skin and soft tissue infections	5 (10.2)
Blurred vision	3 (6.1)
Ataxia	3 (6.1)
Motor weakness	2 (4.1)

CMIR = cell-mediated immune response; IQR = interquartile range

* Some patients might have more than one variable

** Hypertension (15, 30.6%), coronary arterial disease (2, 4.1%), and atrial fibrillation (2, 4.1%)

Table 2. Cerebrospinal fluid profiles of 19 HIV-negative patients with cryptococcosis

Cerebrospinal fluid	Median (IQR)
Opened pressure, cmH_2O	19 (13-33)
Closed pressure, cmH_2O	13 (10-22)
Protein, mg/dL	84 (42-137.7)
Glucose, mg/dL	43 (21.5-59)
White blood cell, cells/mm^3	57 (3-115)
Polymorphonuclear cell, %	4.5 (0-22)
Mononuclear cell, %	79.5 (26.5-98)
Positive India ink/total, n (%)	11/25 (44)
Positive cryptococcal antigen/total, n (%)	18/24 (75)
Cryptococcal titer	1:296 (1:32-1:1024)

IQR = interquartile range

cryptococcal antigen was performed in 26 (53.1%) patients and 84.6% revealed positive results with a median (IQR) titer of 1:640 (1:48-1:1,024). Lumbar puncture was performed in 19 (38.8%) patients and cerebrospinal fluid profiles are shown in Table 2.

Of all, 46 (93.9%) patients were hospitalization and the median (IQR) length of stay was 19.5 (11-36) days. Only 37 (75.5%) patients received antifungal agent for cryptococcal treatment, one patient received only surgical treatment and one patient received both antifungal agent and surgical intervention. There were three reasons why 11 patients did not receive any treatment. First, the physician decided not to treat five patients due to specimen contamination. Second, three patients were too severe to be treated because of multiple organ failures. Third, three patients died before the result of the culture confirming the presence of *Cryptococcus* spp. Two of the 11 patients who did not receive any treatment were alive.

For the antifungal treatment strategies, 22 patients received sequential therapy, four patients received a combination therapy, and 11 patients received monotherapy. The most common regimen for the treatment was either amphotericin B or liposomal amphotericin B for induction phase, followed by fluconazole for consolidation and maintenance phase. The duration of the treatment with amphotericin B or liposomal amphotericin B ranged from two days to four weeks and those of fluconazole ranged from one day to 12 months. Five patients received only fluconazole for the entire course of treatment. The infection in these five patients was lower respiratory tract infection (2 patients) and skin and soft tissue infection (3 patients). One patient with cryptococcal maxillary sinusitis received itraconazole for eight weeks and went on to a maxillary sinus operation.

Of all, 30 (61.2%) patients developed complications, such as acute kidney injury (47%), coma (38.8%), shock (22.4%), neurological deficits (20.4%), respiratory failure (14.28%), disseminated intravascular coagulation (6.1%), and others (4.1%). Twenty-five patients died with an overall mortality rate of 51%. Of these, 19 (38.8%) patients died from cryptococcal-related cause. Causes of death were as follows; cryptococcal meningitis (6 patients), cryptococcal septicemia (7 patients), cryptococccal pneumonia (1 patient), status epilepticus (1 patient), and disseminated cryptococcosis (4 patients). Another

six patients died from other causes which were bacterial pneumonia (2 patients), Gram-negative sepsis (2 patients), multiple myeloma with possible bacterial pneumonia (1 patients), and vasculitis with adult respiratory distress syndrome (1 patients). The recurrent rate was 4.1%.

Comparisons between clinical characteristics and laboratory findings of the patients who died and those who survived are shown in Table 3. Patients who died had a trend towards being older (69.6 years vs. 52.8 years, p = 0.114) and receiving concurrent medications (68.0% vs. 41.7%, p = 0.088). In addition, patients who died were more likely to have alteration of consciousness (52% vs. 16.7%, p = 0.009), lower platelet counts (141,000 cells/mm^3 vs. 270,000 cells/mm^3, p = 0.010), higher total bilirubin (1.2 mg/dL vs. 0.6 mg/dL, p = 0.012), positive blood culture for *C. neoformans* (52.0% vs. 20.8%, p = 0.024), co-infection (76.0% vs. 41.7%, p = 0.015), had complication (76.0%, 45.8%, p = 0.042), especially coma (p<0.001) and shock (p = 0.020). However, patients who died were less likely to have positive serum cryptococcal antigen (32% vs. 58.3%, p = 0.046). Finally, patients who died had a lower proportion of receiving antifungal therapy (68% vs. 87.5%, p = 0.102).

By univariate logistic regression (Table 4), associated factors for mortality were alteration

Table 3. Comparison of characteristics of HIV-negative patients with cryptococcosis between patients who survived and dead

Characteristics	Survived (n = 24)	Died (n = 25)	p-value
Sex, n (%)			0.484
Male	11 (45.8)	9 (36.0)	
Female	13 (54.2)	16 (64.0)	
Median (IQR) age, years	52.8 (43.5-69.1)	69.6 (60.8-72.3)	0.114
Had underlying conditions, n (%)	23 (95.8)	24 (96.0)	1.000
Concurrent medications, n (%)*	10 (41.7)	17 (68.0)	0.088
Clinical presentations, n (%)			
Fever	15 (62.5)	18 (72.0)	0.478
Alteration of consciousness	4 (16.7)	13 (52.0)	0.009
Headache	7 (29.2)	6 (24.0)	0.682
Dyspnea	3 (12.5)	6 (24.0)	0.463
Laboratory findings, median (IQR)			
White blood cell, cells/mm^3	8,805 (7,440-12,950)	10,801 (8,650-14,900)	0.263
Neutrophil, %	73 (63-87)	83 (60-89)	0.463
Platelet counts, cells/mm^3	270,000 (204,000-341,000)	141,000 (104,000-273,000)	0.010
Blood urea nitrogen, mg/dL	17 (11-37)	24 (16-62)	0.077
Creatinine, mg/dL	1.1 (0.9-1.9)	1.2 (0.9-4.2)	0.203
Alanine aminotransferase, U/L	40 (29-62)	41 (34-71)	0.541
Total bilirubin, mg/dL	0.6 (0.4-1.2)	1.2 (0.7-2.9)	0.012
Positive serum cryptococcal antigen, n (%)	14 (58.3)	8 (32.0)	0.046
Positive blood culture for *C. neoformans*, n (%)	5 (20.8)	13 (52.0)	0.024
Co-infections, n (%)	10 (41.7)	19 (76.0)	0.015
Complications, n (%)	11 (45.8)	19 (76.0)	0.042
Acute kidney injury	8 (33.3)	15 (60.0)	0.062
Coma	1 (4.2)	18 (72.0)	<0.001
Shock	2 (8.3)	9 (36.0)	0.020
Neurological deficits	2 (8.3)	8 (32.0)	0.074
Respiratory failure	1 (4.2)	6 (24.0)	0.098
Disseminated intravascular coagulation	0 (0)	3 (12.0)	0.235
Received antifungal therapy, n (%)	21 (87.5)	17 (68.0)	0.171

CSF = cerebrospinal fluid; IQR = interquartile range

* Steroid, immunosuppressive drugs, herb, and chemotherapy

of consciousness (OR = 5.42; 95% CI: 1.43-20.47, p = 0.013), lower platelet counts (OR = 1.06 per 10,000 cells/mm^3, 95% CI: 1.01-1.12, p = 0.025), creatinine (OR = 1.57; 95% CI: 1.02-2.44, p = 0.042), positive blood culture for *C. neoformans* (OR = 4.12; 95% CI: 1.17-14.50, p = 0.028), co-infections (OR = 4.43; 95% CI: 1.3-15.09, p = 0.017), coma (OR = 59.14; 95% CI: 6.66-525.39, p<0.001), shock (OR = 6.19; 95% CI 1.17-32.60, p = 0.032), and received antifungal therapy (OR = 0.30; 95% CI: 0.07-1.32, p = 0.113). By multivariate logistic regression (Table 5), factors associated with mortality were alteration of consciousness (adjusted OR = 6.85; 95% CI: 1.41-33.28, p = 0.017) and co-infections (adjusted OR = 5.32; 95% CI: 1.25-22.69, p = 0.024).

Discussion

To our knowledge, this is one of the largest reports of cryptococcosis in HIV-negative patients, especially in Asia and a resource-limited setting.

Table 4. Factors associated with mortality in HIV-negative patients with cryptococcosis by univariate logistic regression

Characteristics	Crude OR	95% CI	p-value
Sex			
Male	1.00		
Female	1.50	0.48-4.73	0.485
Age, per 10 years	1.25	0.90-1.75	0.185
Underlying conditions	1.04	0.06-17.68	0.976
Concurrent medications*	2.98	0.92-9.57	0.067
Clinical presentations			
Fever	1.54	0.46-5.13	0.480
Alteration of consciousness	5.42	1.43-20.47	0.013
Headache	0.77	0.22-2.74	0.683
Dyspnea	2.21	0.48-10.09	0.306
Laboratory findings			
White blood cell, per 1,000 cells/mm^3	1.09	0.99-1.23	0.145
Neutrophil, per 10%	1.07	0.78-1.47	0.656
Lower platelet count, per 10,000 cells/mm^3	1.06	1.01-1.12	0.025
Blood urea nitrogen, per 10 mg/dL	1.24	0.97-1.60	0.091
Creatinine, mg/dL	1.57	1.02-2.44	0.042
Alanine aminotransferase, per 10 U/L	1.02	0.88-1.18	0.834
Total bilirubin, mg/dL	1.98	0.89-4.39	0.092
Positive serum cryptococcal antigen	0.30	0.11-0.84	0.022
Positive blood culture for *C. neoformans*	4.12	1.17-14.50	0.028
Co-infections	4.43	1.30-15.09	0.017
Complications	3.74	1.10-12.67	0.034
Acute kidney injury	3.00	0.93-9.63	0.065
Coma	59.14	6.66-525.39	<0.001
Shock	6.19	1.17-32.60	0.032
Neurological deficits	5.18	0.97-27.60	0.054
Respiratory failure	7.26	0.80-65.71	0.078
Received antifungal therapy	0.30	0.07-1.32	0.113

CI = confidence interval; OR = odds ratio

* Steroid, immunosuppressive drugs, herb, and chemotherapy

Table 5. Factors associated with mortality in HIV-negative patients with cryptococcosis by multivariate logistic regression

Characteristics	Adjusted OR	95% CI	p-value
Alteration of consciousness	6.85	1.41-33.28	0.017
Co-infections	5.32	1.25-22.69	0.024

CI = confidence interval; OR = odds ratio

Cryptococcosis is still an important issue in HIV-negative patients, including patients with underlying medical conditions or predisposing factors. The present study included 49 patients diagnosed with cryptococcosis during six years. They were elderly with the a median age of approximately 60 years and almost all patients had underlying medical conditions including concurrent medications that influence the immune system. The mortality rate was still high although this report was conducted during in the era of modern medicine. Some factors were found to be associated with mortality.

Our patients were predominately female in contrast to previous studies from other countries[7-10]. However, this result was consistent with that of our previous cohort in which most of the patients had systemic lupus erythematosus as an underlying disease[1]. More than half of the cryptococcosis cases occurred in patients over 60 years old and it was the same as previous studies[7,8]. However, the age in the authors patients ranged from 16 to 88 years old. Almost all our patients had an underlying condition and half of them received current medications that are associated with immunological impairment. This might be explained by the fact that the information of the patients came from a tertiary care hospital for which the baseline characteristics of the patients were severe. In the previous studies, the authors already knew that the most common underlying medical conditions of cryptococcosis in HIV-negative patients were T-cell suppression, such as hematologic malignancy, organ transplantation, being on prednisolone therapy >700 mg in total, and being on T-cell cytotoxic agents for more than two weeks[7,9,10].

The most common site of infections in the present study was the central nervous system, followed by blood, and respiratory tract, which were similar to the previous reports[1,7]. The study comparing clinical presentation of cryptococcosis between HIV-negative and HIV-positive patients showed that pulmonary involvement occurred more frequently in HIV-negative patients, whereas neurological involvement occurred more frequently in HIV-positive patients[3]. Lumber puncture was not routinely performed in our patients although it is recommended[11]. Some patients might have asymptomatic central nervous system infection[1] and probability of central nervous system infection might be underestimated.

The update clinical practice guideline for management of cryptococcal disease by the Infectious Diseases Society of America has been recently published[11]. The treatment regimens depend on underlying conditions, site of infection such as the central nervous system infection versus non-central nervous system infection, and degree of severity of the infection. The mainstay of treatment for cryptococcosis in HIV-negative patients is liposomal amphotericin B plus flucytosine in the induction phase, followed by fluconazole in consolidation and maintenance phase, which is the same as in HIV-infected group but for a longer duration. In the present study, only about 75% of the patients received antifungal treatment. Surprisingly, 22.4% of the patients received no treatment because of misdiagnosis, were lost to follow-up, or moribund status after performing microbiological culture. Because flucytosine has not been available in Thailand for a very long period, no patients were treated with flucytosine. Most of our patients received only amphotericin B or liposomal amphotericin B during the induction phase followed by fluconazole in consolidation and maintenance phase.

The mortality rate in the present study was high at 51% compared to other studies, which ranged from 10 to 30%[7,9,10,12]. However, the mortality-related to cryptococcosis itself is approximately 40%. This high mortality rate might be explained by the greater severity of our patients that had underlying conditions, co-infections, and did not receive any antifungal agent for whatever reasons. The relapse rate was 4.1%, which was comparable to previous studies[7,10]. Reported risk factors for mortality of patients with cryptococcosis were age >60 years[7,9], hematologic malignancy[4,7,10], alteration of mental status[4,9,10,13-15], neoplastic diseases[9], disseminated diseases[9], corticosteroid therapy[4,14,16], treatment failure[9], organ failure[7], hypoglycorrhachia[4,14,16], cerebrospinal fluid cell count <20 cells/mm^3 before treatment[4,14,16], and high titers of cerebrospinal fluid cryptococcal antigen[4,10,13-15]. In the present study, patients who died were more likely to use herbal medicine, had alteration of consciousness, co-infection, coma, shock, positive blood culture, and lower platelet and less likely to have positive serum cryptococcal antigen. The authors also determined two factors associated with mortality, which are alteration of consciousness and co-infections. The factors of co-infection has not been reported elsewhere, which might be associated with the greater severity of the cryptococcal disease.

There are some limitations to the present study. First, the study was conducted in a single tertiary care hospital by retrospective chart review and the

enrolled patient number was small. These facts may limit generalization of the results to another population. Second, there was the absence of typing of cryptococcal varieties. Third, the authors did not perform systematic investigations of disseminated infection by means of lumbar puncture, serum, and cerebrospinal fluid cryptococcal antigen test. The number of patients with central nervous system infection and/or disseminated infection may be underestimated.

In summary, cryptococcosis is not rare in HIV-negative patients and the mortality rate is still very high. It should be recognized as a possible cause of meningitis and pulmonary infection even in HIV-negative patients, especially in patients who have underlying medical condition in which T-cell functions were suppressed. Early recognition of cryptococcosis, use of appropriate antifungal therapy including treatment of co-infections may improve clinical outcomes especially in patients who had risk factors of mortality.

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What is already known on this topic?

There are some reports on this topic but none in Thai patients. Most are descriptive study and not analytic.

What this study adds?

This is the largest reports of cryptococcosis in HIV-negative patients in Thailand. It also shows the factors associated with mortality, which there is limited data regarding this issue. We found new factors that associated with mortality in Thai patients.

Potential conflicts of interest

None.

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ลักษณะทางคลินิกและปัจจัยเสี่ยงของการเสียชีวิตในผู้ที่ติดเชื้อคริปโตคอคคอลที่ไม่ได้ติดเชื้อเอชไอวี

ภัทรินทร์ ผ่องเมฆินทร์, พิริยาภรณ์ จงตระกูล, พิทักษ์ สันตนิรันดร์, ศศิโสภิณ เกียรติบูรณกุล

วัตถุประสงค์: *เพื่อศึกษาลักษณะทางคลินิก, การรักษา, ผลการรักษา, ภาวะแทรกซ้อนและปัจจัยที่มีความสัมพันธ์กับอัตราการเสียชีวิตในผู้ป่วยที่เป็นคริปโตคอคโคซิสที่ไม่ได้ติดเชื้อเอชไอวี*

วัสดุและวิธีการ: *เป็นการศึกษาแบบเก็บข้อมูลย้อนหลังในผู้ป่วยผู้ใหญ่ที่ไม่ได้ติดเชื้อเอชไอวีที่มีผลการเพาะเชื้อเป็นบวกต่อคริปโตคอคคัส นีโอฟอร์แมนส์ ระหว่างปี พ.ศ. 2548-2553*

ผลการศึกษา: *มีผู้ป่วยทั้งหมด 49 ราย มีค่ากลางของอายุ (พิสัยระหว่างควอร์ไทล์) 62.5 (45.5-71.9) ปี และร้อยละ 40.8 เป็นเพศชาย ภาวะร่วมที่ผู้ป่วยมีร่วมด้วยที่พบบ่อยที่สุดคือ โรคหลอดเลือดหัวใจ (ร้อยละ 36.7) ตำแหน่งที่พบว่ามีการเพาะเชื้อเป็นบวกที่พบบ่อยคือ น้ำไขสันหลังหรือหนองจากเนื้อสมอง (ร้อยละ 46.9), กระแสเลือด (ร้อยละ 36) และเสมหะหรือน้ำล้างถุงลม (ร้อยละ 28.6) ผู้ป่วย 29 ราย (ร้อยละ 59.2) มีการติดเชื้ออื่นร่วมด้วยเช่น แบคทีเรียแกรมลบ (ร้อยละ 24.4) มัยโคแบคทีเรีย (ร้อยละ 17.8) และแบคทีเรียแกรมบวก (ร้อยละ 13.3) อาการแสดงที่พบบ่อยคือ ไข้ (ร้อยละ 67.3), ระดับความรู้สึกตัวลดลง (ร้อยละ 34.7) และปวดศีรษะ (ร้อยละ 26.5) พบภาวะแทรกซ้อน ร้อยละ 61.2 เช่น ไตวายเฉียบพลัน (ร้อยละ 47), หมดสติ (ร้อยละ 38.8) และช็อก (ร้อยละ 22.4) อัตราการเสียชีวิตคือ ร้อยละ 51 โดยการวิเคราะห์แบบถดถอยโลจิสติกเชิงพหุพบปัจจัยที่มีความสัมพันธ์กับอัตราการเสียชีวิตคือ ระดับความรู้สึกตัวลดลง (อัตราส่วน odds 6.85; ช่วงความเชื่อมั่นร้อยละ 95 เท่ากับ 1.41-33.28, ค่าพีเท่ากับ 0.017) และการมีติดเชื้ออื่นๆ ร่วมด้วย (อัตราส่วน odds 5.32; ช่วงความเชื่อมั่นร้อยละ 95 เท่ากับ 1.25-22.69, ค่าพีเท่ากับ 0.024)*

สรุป: *ผู้ที่เป็นคริปโตคอคโคซิสที่ไม่ได้ติดเชื้อเอชไอวีมีอัตราการเสียชีวิตสูงมาก ปัจจัยที่มีความสัมพันธ์คือ ระดับความรู้สึกตัวลดลงและการติดเชื้อร่วมอื่นๆ ดังนั้นการวินิจฉัยและการรักษาผู้ป่วยเหล่านี้อย่างรวดเร็วมีความสำคัญและอาจทำให้อัตราการเสียชีวิตลดลง*