Clinical, Epidemiological Features and Outcomes of Blastomycosis in A Tertiary Hospital in Kentucky

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INTRODUCTION

- Blastomycosis, caused by Blastomyces dermatitidis, is endemic in areas of the United States and Canada surrounding the Ohio and Mississippi River valleys and the Great Lakes.[1] It can present with subclinical infection to acute respiratory distress syndrome.[2,3]
- The risk factors associated with severe manifestation of blastomycosis are not well defined.

METHODOLOGY

- A retrospective study of patients diagnosed or treated for blastomycosis at the University of Kentucky from January 2004-March 2019 were included.
- Severe cases were defined as patients that required ICU care.
- Logistic regression was used to identify variables associated with severe infections

Table 1: Characteristics of Patients with Blastomycosis

Characteristics	Total	Immunosuppressed	Immunocompetent	*p*-value
	n=82	n=26	n=56	
Age, y [range]	48 (16 - 89)	61 (37-85)	40 (16-89)	**0.001**
Gender, male	66 (80.5%)	23 (88.4%)	43 (76.7%)	0.250
Race, white	71 (92.2%)	22 (95.6%)	49 (90.7%	1.000
Tobacco use	52 (68.3%)	18 (69.1%)	34 (68.0%)	0.308
DM	24 (29.2%)	9 (34.6%)	15 (26.7%)	0.603
COPD	21 (25.6%)	8 (30.7%)	13 (23.2%)	0.588
BMI>30	25/77 (32.4%)	8 (32.0%)	17 (32.6%)	1.000
CNS symptoms	4 (4.8%)	3 (11.5%)	1 (1.7%)	0.092
Inpatient admission	61 (74.3%)	23 (88.4%)	38 (67.8%)	0.059
ICU admission	19 (31.1%)	10 (43.4%)	9 (23.6%)	0.154
Mortality	11 (13.4%)	6 (23.0%)	5 (8.3%)	0.094
WBC, [range], ($x10^3/\mu l$)	11.2 (0.9-40.7)	11.6 (0.9-40.7)	11.2 (4.8-35.8)	0.845
AST,[range],(U/l)	20 (6-227)	17 (6-69)	24 (7-227)	**0.028**
ALT,[range], (U/l)	21 (5-432)	17 (8-68)	22 (5-432)	0.074
Creatinine,[range], (mg/dL)	0.93 (0.26-6.98)	0.99 (0.44-2.35)	0.92 (0.26-6.98)	0.638

Figure 1: Type of presentation

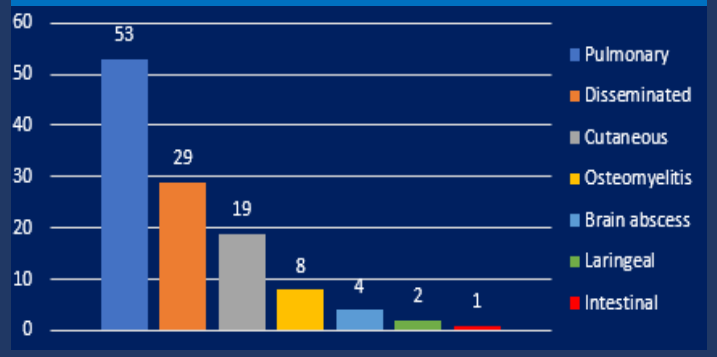

Table 2: Distribution of diagnostic tests results

	n(%)
Positive KOH stain	31/60 (51.6%)
Positive culture	59/69 (85.5%)
Bronchoalveolar lavage	20 (29.4%)
Sputum	13 (19.1%)
Lung Tissue	11 (16.1%)
Skin	5 (7.3%)
Bone	4 (5.8%)
Brain	2 (2.9%)
Other	6 (8.8%)
Positive Histopathology for BBB	48/67 (71.6%)
Bronchoalveolar lavage	17 (25.3%)
Lung Tissue	12 (17.9%)
Skin	9 (13.4%)
Bone	2 (2.9%)
Other	12 (17.9%)
Histoplasma antigen, serum	9/14 (64.2%)
Histoplasma antigen, urine	33/44 (70.2%)
Blastomyces antigen	16/24 (66.6%)
Blastomyces antibody EIA	19/55 (34.5%)
Blastomyces antibody ID	6/55 (11.1%)
Histoplasmas mycelial CF	1/55 (1.8%)
Histoplasmas yeast CF	7/55 (12.7%)
Histoplasma antibody ID	2/55 (3.6%)

Table 3: Univariate and Multivariate analysis for the associated risk factors for severe infection

	Univariate analysis			Multivariate analysis		
	IRR	[95% CI]	*p*	IRR	[95% CI]	*p*
Age older than 50y	4.02	1.60-10.09	0.003	3.55	1.42 – 8.83	**0.006**
Male, sex	0.96	0.37-2.52	0.950	1.96	0.84 – 4.55	0.117
Diabetes	2.95	1.40-6.22	0.004	2.52	1.16 – 5.50	**0.019**
Obesity	2.60	1.16-5.80	0.020	3.11	1.42 – 8.83	**0.005**
Hb <10g/dL	2.27	1.06-4.84	0.033	3.01	1.55 - 5.85	**0.001**
WBC <4.0 or >12.0 (x103/µl)	1.04	1.01-1.07	0.001	1.03	1.00 – 1.07	**0.030**

RESULTS

- A total of 82 patients were included. Table 1
- Immunosuppressed cases: Malignancies (19 cases), autoimmune diseases (5 cases), chronic steroid use (3 cases), and transplant (2 cases). No HIV case was found. (figure 1), immunosuppression was not found to have any impact in mortality (p= 0.094).
- Urine *Histoplasma* or *Blastomyces* antigen was positive in 41/58 (70.6%), and Serum Histoplasma or Blastomyces antigen was positive in 22/34 (64.7%) (Table 2).
- Initial antifungal treatment was amphotericin B liposomal in 38/80 (47.5%).
- A multivariable analysis was performed to find predictors of severe blastomycosis infection (Table 3).

CONCLUSION

- Pulmonary Blastomycosis is the most common presentation, independent factors associated to severe disease were older age, obesity, diabetes, and anemia at admission.
- Culture and histopathology are more sensitive than antigen assay. Serology is the least sensitive assay.

References

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3. Lohrenz, S., et al. (2018). " Med Mycol 56(7): 787-795.