



**CT FOLLOW-UP OF BILATERAL ADRENAL DISSEMINATED  
CRYPTOCOCCOSIS IN IMMUNOCOMPETENT PATIENT WITH ADDISON'S  
DISEASE: CASE REPORT**

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**ABSTRACT**

Disseminated cryptococcosis rarely occurs in immunocompetent hosts. Here, we describe a case of an immunocompetent patient with Addison's Disease caused by bilateral adrenal disseminated cryptococcosis which presented as adrenal enlargement without enhancement in computed tomography (CT). No changes were found in CT follow-up (10 months) while an improvement of the serum cryptococcal antigen titers was performed, which suggested that non-enhancing masses denoted the stable stage of adrenal fungemia. We conclude that bilateral adrenal cryptococcal masses is a cause of Addison's Disease in immunocompetent patients and CT may be valuable on assessing the activity of the masses.

**Key Words:** Cryptococcus spp., Primary adrenal insufficiency, fungemia, immunocompetent

## INTRODUCTION

Cryptococcosis is an opportunistic infection for the tendency of occurring in immunocompromised individuals. The most commonly target organs are meninges and lung.[1, 2] There are few reports about cryptococcal adrenal glands in immunocompetent patients. [3-7] Peripheral enhancement of adrenal masses were presented in the most of these cases. Here in, we describe a case of an immunocompetent patient with Addison's Disease caused by bilateral adrenal cryptococcosis which presented with adrenal masses without enhancement and continued in CT follow-up for 10 months.

## CASE REPORT

A 71-year old man presented walking unsteadily and decline of audition for 3 months. He had a history of hepatitis B (HBV) forty years ago and did not use drugs in recent decades. Bilaterally adrenal masses were found by CT scan. A percutaneous adrenal gland puncture biopsy of left adrenal gland was performed for followed histopathology, *Cryptococcus* spp. were identified within the adrenal tissue. Addison's Disease was verified by hormone examination in some hospital.

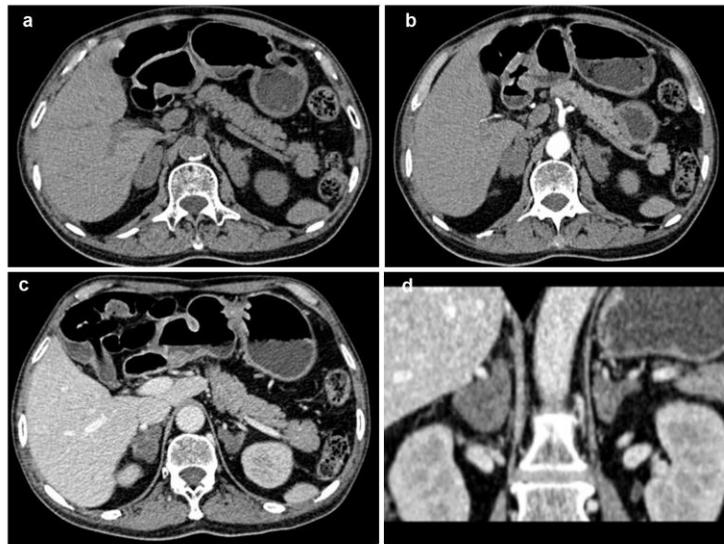
Then he came to central hospital (jingzhou,China) for an antifungal therapy. Eczema of neck and sporadic skin pigmentation were found in physical examination. A neurological examination revealed no focal or lateralizing deficits. His blood pressure was 100/72mmHg, heart beats, 76 per minute, and temperature, 36.1°C.

The laboratory data at the time of admission showed in table 1. His white cell count was 1015/ $\mu$ L which was a little high than normal at 1000/ $\mu$ L. Although having a history of HBV, his HVB surface antigen (HBsAg) was negative as well as HIV and HCV. The red blood cell count and hemoglobin were lower than normal but not low enough to anemia. The liver function was slightly abnormal. Kidney function tests and levels of serum electrolytes were normal.

Parameter	Values	Reference values	Parameter	Values	Reference values
WBC	1015	3500-9500 (/ $\mu$ L)	ALT	25	9-50U/L
NEU	79.7	40.0-75.0%	AST	14	15-40 U/L
LYM	9.5	20.0-50.0%	TBIL	12	3.4-20.4 $\mu$ mol/L
MON	10.3	3.0-10.0%	DBIL	2.9	<6.8 $\mu$ mol/L
RBC	119	130-175(g/L)	ALP	34	45-125 U/L
HCT	35.4	40-50%	GGT	14	10-60 U/L
MCH	30	27.0-34.0pg	Albumin	39	40-55g/L
MCV	89.2	82.0-100.0fl	Globulin	23	40-55g/L

**Table 1:** Laboratory Findings at Admission

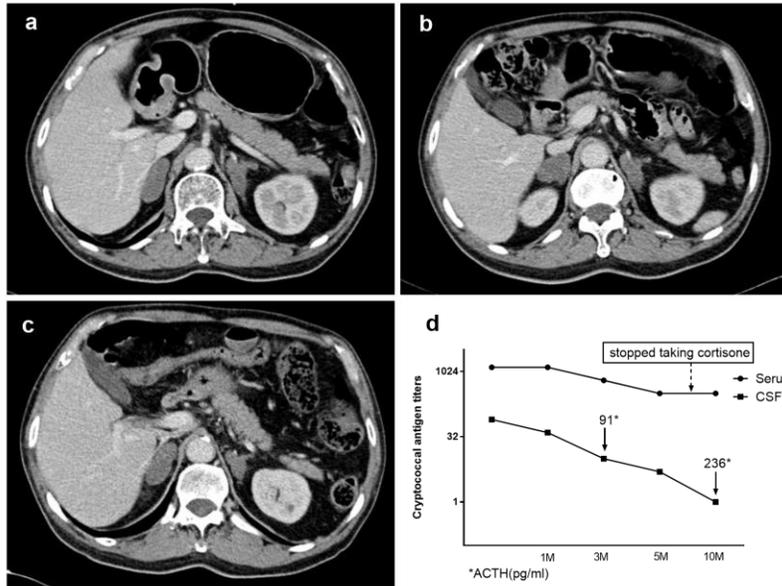
A culture of the colorless cerebrospinal fluid (CSF) revealed no growth of *Cryptococcus* spp. . The CSF and serum cryptococcal antigen titers were 1:80 and 1:1280, respectively. Contrast-enhanced abdomenCT demonstrated bilateral adrenal masses(right: 3.7×2.5cm, left:3.0×2.7cm) without enhancement. Andliver cirrhosis was not revealed (Fig 1.).



**Figure 1:** CT imaging on admission. (a) Pre-contrast CT of abdomen showed bilateral adrenal masses without calcification. (b,c) Enhanced CT of arterial phase(b) and venous phase(d), no enhancement was observed. (d) CT in multiplane reformation(MPR).

Based on the diagnosis of cryptococcal infection and adrenal insufficiency, the patient was treated with intravenous liposomal amphotericin B combined with oral flucytosine and cortisone

acetate. Regular CT follow-up were performed in the third, fifth and tenth month. During treatment, he stopped taking cortisone once for 1 month. It was notable that the plasma adrenocorticotrophic hormone (ACTH) ascended from 91pg/ml to 236pg/ml without any change of CT images in this period. Meanwhile, the CSF and serum cryptococcal antigen titers declined continuously (Fig. 2)



**Figure 1:** (a-c) CT follow-up in the third (a) fifth (b) and tenth month (c) respectively. The size of adrenal masses had no changes. (d) Cryptococcal antigen titers of serum and CSF showed a tendency of decline in 10 months. A rise of ACTH(\*) was revealed when the patient stopped taking cortisone.

## DISCUSSION

Addison's disease, as known as primary adrenal insufficiency, is a relatively uncommon disease with hypoactive adrenal glands, which may present with muscular weakness, loss of weight, hypotension and pigmentation. Hyponatremia, hyperkalemia and hypoglycemia can show at the time of crisis[8]. The etiologies of Addison's disease can be autoimmune disease, dysgenesis, hemorrhage, metastases, infiltration, infection, pharmaceuticals and adrenalectomy.[8, 9] Tuberculosis is the most common infected cause. Cryptococcosis, considered as an opportunistic infections, caused in Addison's disease was rare and mostly reported in immunocompromised patients particularly those with HIV.[2] However, this view has been challenged because of dramatic increase of cryptococcosis in immunocompetent hosts.[10] In other words, cryptococcosis should be considered in immunocompetent patients with septicemia.

In present case, disseminated cryptococcosis was demonstrated by CSF and serum cryptococcal antigen titers. Addison's Disease was proved by hormone examinations. CT scan and Puncture biopsy of left

adrenal gland indicated that that cryptococcosis may be the reason of adrenal insufficiency. This patient had been in healthy and did not have HIV, tuberculosis or malignancies. Although he had a history of HBV, the recovery was verified by the negative HBsAg test. Liver cirrhosis was not revealed in CT scan as well. He was considered to be immunocompetent.

	[4]	[5]	[6]	[7]	Present study
PMH	DM	-	DM	-	HBV(cured)
Systemic conditions	liver mass	-	lung mass	lung mass, meningitis	meningitis
Lesion	bilateral	bilateral	bilateral	bilateral	bilateral
Enhancement	peripheral	no	peripheral	peripheral	No
Surgery	unilateral	no	no	bilateral	No
Fellow-up images	shrunked	-	shrunked	-	continued

**Table 2:** Comparison of Prior Cases including CT images

PMH : previous medical history DM: diabetes mellitus

On comparing the CT findings in our patient with reported immunocompetent patients with adrenal cryptococcal infection, we noted several differences (Table 2.). Most cases were described as the masses of bilateral adrenal glands with peripheral enhancement. [4, 6, 7] Hung et al. reported a case of adrenal cryptococcal infection without enhancements. [5] The masses were described being continued in this case, however, no images were shown in their report. To our knowledge, this is the first report which has follow-up CT for 3 times in 10 months in immunocompetent patient with bilateral adrenal cryptococcosis combining with Addison's Disease. Moreover, it was significant that no changes were observed in follow-up CT images when the patient stopped using cortisol and ATCH ascending was presented. This indicates that non-enhancing adrenal masses is a stable stage with irreversible insufficiency of adrenal glands caused by cryptococcosis and antifungal therapy is useless in recovery of adrenal insufficiency. Meanwhile, the loss of volume was appeared after treatment in the cases which showed peripheral enhanced in enlarged adrenal glands. [4, 6] This confirms that peripheral enhancement indicates an active stage of adrenal cryptococcosis. In summary, the pattern of enhancement can reflect the activity of adrenal fungemia.

## CONCLUSION

In conclusion, we present a case of immunocompetent patient with Addison's Disease caused by bilateral adrenal disseminated cryptococcosis. Enhanced CT scan can be valuable in activity assessment of adrenal cryptococcal infections.

## REFERENCES

1. Saag MS, Graybill RJ, Larsen RA, Pappas PG, Perfect JR, Powderly WG, Sobel JD, Dismukes WE: Practice guidelines for the management of cryptococcal disease. Infectious Diseases Society of America. *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America* 2000, 30(4):710-718.
2. Perfect JR, Dismukes WE, Dromer F, Goldman DL, Graybill JR, Hamill RJ, Harrison TS, Larsen RA, Lortholary O, Nguyen MH *et al*: Clinical practice guidelines for the management of cryptococcal disease: 2010 update by the infectious diseases society of america. *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America* 2010, 50(3):291-322.
3. Jain TK, Karunanithi S, Bal C, Kumar R: 18F-FDG PET/CT Imaging in Adrenal Cryptococcosis. *Clinical nuclear medicine* 2017, 42(4):e194-e195.
4. Matsuda Y, Kawate H, Okishige Y, Abe I, Adachi M, Ohnaka K, Satoh N, Inokuchi J, Tatsugami K, Naito S *et al*: Successful management of cryptococcosis of the bilateral adrenal glands and liver by unilateral adrenalectomy with antifungal agents: a case report. *BMC infectious diseases* 2011, 11:340.
5. Hung ZS, Lai YH, Hsu YH, Wang CH, Fang TC, Hsu BG: Disseminated cryptococcosis causes adrenal insufficiency in an immunocompetent individual. *Internal medicine* 2010, 49(11):1023-1026.
6. Ranjan P, Jana M, Krishnan S, Nath D, Sood R: Disseminated cryptococcosis with adrenal and lung involvement in an immunocompetent patient. *Journal of clinical and diagnostic research : JCDR* 2015, 9(4):OD04-05.
7. Ito M, Hinata T, Tamura K, Koga A, Ito T, Fujii H, Hirata F, Sakuta H: Disseminated Cryptococcosis with Adrenal Insufficiency and Meningitis in an Immunocompetent Individual. *Internal medicine* 2017, 56(10):1259-1264.
8. Ten S, New M, Maclaren N: Clinical review 130: Addison's disease 2001. *The Journal of clinical endocrinology and metabolism* 2001, 86(7):2909-2922.
9. Charmandari E, Nicolaidis NC, Chrousos GP: Adrenal insufficiency. *Lancet* 2014, 383(9935):2152-2167.
10. Kronstad JW, Attarian R, Cadieux B, Choi J, D'Souza CA, Griffiths EJ, Geddes JM, Hu G, Jung WH, Kretschmer M *et al*: Expanding fungal pathogenesis: Cryptococcus breaks out of the opportunistic box. *Nature reviews Microbiology* 2011, 9(3):193-203.