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Autopsy Findings in Malaria cases; a Hospital Based Study

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ABSTRACT

Introduction: Malaria is a huge health care burden in terms of mortality and morbidity worldwide. There has been evidence in the literature where many unexpected/unexplained deaths turned out to be related to malaria in endemic regions. Autopsy study of cases with unexplained fever are turn out to be malarial death. **Method**: This study included 598 cases of autopsy. H&E staining, bleaching techniques and pearl's stain were used to identify malarial pigments in suspected cases. **Results**: In present study out of 598 autopsy cases, 12 cases were diagnosed having death due to malaria. All cases showed significant splenomegaly and microscopic examination of submitted organs showed presence of malarial pigments. **Conclusion**: In malaria endemic areas death due to unexplained fever, jaundice or severe hepato-splenomegaly should be critically investigated.

Keywords: Malaria, Autopsy Finding, Malarial Death.

Introduction

Malaria is a major public health problem in developing countries and is the top ranked priority tropical disease of the World Health Organization. Malaria is endemic in 109 countries with a disease burden of approximately 500 million clinical attacks of malaria worldwide annually. Among them, 2–3 million cases are severe and about a million people die a year (about3000 deaths every day)according to current WHO estimates.[1]In majority of the cases, malaria is well diagnosed in ante-mortem settings and there have been only few reported cases in the literature where malaria has been diagnosed as the cause of death.[2,3] Since it is not a common cause of unexpected death and can potentially masquerade a variety of disorders, it can easily be missed if this possibility is not considered while performing autopsy especially in malaria endemic regions. Sometimes asymptomatic parasitemiais common in endemic areas, clinical diagnosis may be easily missed and confirmation of the diagnosis of malaria as the cause of unexpected death often has to rely on postmortem findings.[4] Despite an excellent health care system with specific and effective therapy options, fatalities do occur due to late presentation of patients for treatment. It is then the pathologist's challenge to discover the truth after postmortem. In case of advanced autolysis, the histological diagnostic may be hindered or rendered impossible.This retrospective study has been undertaken with an objective to highlight postmortem findings in malarial death.

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Material and Method

The study covers a period of one year (January 2013 – December 2013) and it is a study of cases of autopsy carried out in a tertiary care hospital of South Gujarat. A total of 598 cases examined, out of which malarial pigments were detected in 12 cases. To make the definite diagnosis of malaria, we did 3 staining methods for all organ samples: (1) Hematoxylin and Eosin to show malaria pigment that was brownish black in color. (2) Hematoxylin and Eosin staining after bleaching to exclude formalin pigment and (3) pearls staining to exclude hemosiderin pigment. We received the gross specimen of the lungs, heart, liver, kidney, spleen and the brain for histopathological examination in all autopsy cases. The data of clinical history, gross and microscopic examination of all cases were analyzed.

Results

In present study out of 598 autopsy cases, 12 cases diagnosed having death due to malaria. From 12 cases,

10 cases were males while 2 cases were females. The youngest patient was 5 year male child while elderly was 70 year old male patient.Most of the cases presented with history of fever, jaundice, altered sensorium and unconsciousness. On gross examination of submitted viscera, splenomegaly was found in all 12 cases and hepatomegaly was found in 4 cases. Spleen showed typical slate gray color in most of the cases due to malarial pigments. On microscopic examinations all the organs like heart, lungs, liver spleen, kidney and brain showed congestion. Congested vessels are studded with brownish black malarial pigments. Liver showed kupffer cell hyperplasia and sinusoidal dilatation. Kupffer cells are studded with malarial pigments. Spleen also showed massive congestion with malarial pigments. In brain congested vessels with parasitized RBCs were found in all cases. In all 12 cases,cerebral malaria with multi-organ involvement was diagnosed a cause of death.

Table 1: Relation between age,sex and clinical findings

Sr. No.	Age	Sex	Clinical Findings
1	19	M	Fever
2	50	M	Jaundice
3	38	M	Jaundice, Unconsciousness
4	48	M	Fever
5	60	M	Altered Sensorium
6	27	F	Fever, Jaundice
7	45	F	Jaundice
8	35	M	Jaundice
9	31	M	Fever
10	40	M	Fever
11	5	M	altered Sensorium
12	70	M	Fever, Jaundice

Discussion

Malaria remains the most important parasitic disease worldwide.The case fatality rate of strictly defined cerebral malaria in endemic areas remains of the order of 20% in adults and 15% in children.[5]There were 4 types of malaria found in human based on the types of parasite.(P Rp) Mortality of malaria is often caused by complication of severe malaria due to *P. falciparum* infection. Human cerebral malaria caused by P. falciparum is the malignant form of malaria responsible for sudden deconditioning and death. In the present literature review, more than 95% of the sudden unexpected malaria deaths were due to P. falciparum. The complications happened because the parasite had the capability of sequestrating into organ capillaries which did not happen in the other types of parasite. The effects of sequestration could cause functional disturbance of the organs and lead to organ failure.[6,7]Malaria pigments were found in the brain, heart, liver, intestines, spleen and kidney.[8] Histopathological examination showed malaria pigments at the parenchyma and within RBC of vessels. Study in Jodhpur reported that histopathological feature in liver due to *P. falciparum* showed malaria pigments (90%), liver cell necrosis (18,3%) and fatty change (15%).[9]In our study all 12 cases showed malarial pigments in liver parenchyma with 4 cases also showed fatty change. Splenomegaly is usually found in chronic malaria, children and semi-immune people, but not in severe malaria. But in present study, all 12 cases showed varying degree of splenomegaly grossly. In malaria endemic areas splenomegaly is a common finding in patient having malaria, resulting from abnormal immune responses after repeated exposure to the malaria parasites.[10]Microscopically malarial pigments found in interstitium in all cases. The brain usually shows edematous and hyperemic changes in the white matter which differ cerebral malaria from viral encephalitis where the hyperemia was found mostly in substantianigra.[11]Cerebral malaria as the cause of

death should be carefully considered, and should be based on the finding of malaria parasite or pigment in the brain, that is usually hard to find in post mortem examination. Brain blood vessels were congested and clogged by erythrocyte clusters. Fine black pigments were found in the erythrocytes and inside the capillary lumen. Newman *et al*,14 reported that renal failure and cerebral malaria was common clinical complication among U.S. travelers.[12]Similar findings were observed in present study with presence of malarial pigments in kidney. We found malarial pigments in the brain in all cases, but we diagnosed the case as severe malaria, since the finding of malaria parasite or pigment in the brain might give various symptoms depending on the sequestration density, while death could be due to other organ failure. Post mortem diagnosis of severe malaria is usually determined by the appearance of the parasite and malaria pigment in almost all organs. Clinically Severe jaundice with fever and splenomegaly with slate gray color on autopsy examination raises the suspicion of malaria which can be diagnosed by autopsy examination.

Conclusion

In malaria endemic areas, death due to unexplained fever, jaundice or severe hepato-splenomegaly should be critically investigated and finding of malarial pigments in autopsy examination helps to solve unexplained death in case of fever.

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