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Leading Article

Tuberculosis in Children with Cancer

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Tuberculosis is often not considered an entity in cancer particularly in childhood cancer. As with immunocompromised states like HIV the chances of tuberculosis is more in cancer due to the disease itself and also for the chemotherapeutic agents particularly high doses of steroid which render a patient to be more vulnerable. More so latent tuberculosis which may not need any treatment in the immunocompetent host might develop into an active state in child with cancer which if not treated could be fatal. There are many tumors like Hodgkin lymphoma which can concurrently have Tuberculosis due to the T helper cell defect.[1-3]

Epidemiology of TB

Despite the decline in TB deaths and incidence the TB epidemic is larger than previously estimated. In 2015 there had been an estimated 10.4 million new (incidence) TB cases worldwide of which5.9 million(56%) were among men, 3.5 million (34%) among women and1.0 million among children. People living with HIV alone accounted for 1.2 million (11%) of all TB new cases. In 2015 there were an estimated 480000 new cases of multidrug resistant TB cases of multidrug resistant TB(MDR TB) and an additional 100000 people with rifampicin resistant TB (RR-TB).

The south east asia region accounts for a disproportionately high numer of Global TB cases and Bangladesh is one of 22 high TB burden countries. In 2014 there were 187, 005 new TB cases in Bangladesh and it was the leading cause of death accounting for 81,000 fatalities.

Tuberculosis ranks as one of the leading causative disease of mortality worldwide with 8.6 million of new cases. More over it is estimated that one third of the population is infected with M. tuberculosis which involves an eventual risk of progressing to active TB. Patient with immunosuppression either due to underlying disease of origin are specially susceptible to developing this disease.

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Malignancies which are mostly associated with tuberculosis

Children with cancer have an increased risk of developing Tuberculosis. The following cancers and treatment were listed as increasing the risk of Tuberculosis in the 1970s in USA: prolonged corticosteroid treatment, gastrectomy, leukemia, silicosis, Hodgkin disease, severe or poorly controlled Diabetes and in children with measles and whooping cough and in the 1980s head and neck cancers were added to the list .MD Anderson cancer centre in the 1990s in a study has demonstrated that patients with hematologic malignancies have Tuberculosis rates of >200 cases per 100000 persons 40 times greater rate than the contemporary US population. Haematological malignancies particularly Hodgkin and NonHodgkin Lymphoma, Acute lymphoblastic and myeloblastic Leukemia, Multiple Myeloma had all been implicated with higher incidence of Tuberculosis though authors have differed with the disease and propensities.[7-10]

Risk of developing tuberculosis in patients with hematological malignancy

Children with cancer have an increased risk for life threatening infection due to their underlying illness and intensive anticancer treatment as well. Although the majority of infections in children are caused by bacteria, infections due to mycobacteria are also reported and may be life threatening. Patients with immunodeficiencies particularly those suffering from hematological malignancies have a greater risk of TB disease once infected. It is estimated that relative risk of TB disease in patients with hematological malignancies is 2-40 times greater than that of general population.[11] The diagnosis of TB in these patients are sometime difficult because they often present with clinical characteristics that are distinct to those patients without any underlying disease.

Hodgkin Lymphoma needs particular mention because it is time and again cited as one of the most common disease in childhood having most occurrence.

Hodgkin lymphoma is one of the most common malignancies seen in children. In Hodgkin lymphoma in endemic region pulmonary Tuberculosis can precede Hodgkin Lymphoma. It can also be seen at HL diagnosis during or after the treatment. The association of HL with Tuberculosis makes it complicated to differentiate the diagnosis because of similarities in the clinical course, laboratory tests and imaging procedures.[12]

Diagnosis of latent tubercular infection

The aim of diagnosing latent tubercular infection (LTBI) in patients with hematological malignancy is early detection of infection of M. tuberculosis which still in the latent phase, so treatment can be undertaken that eliminates the Bacillus before the immune condition further deteriorate and the risk of TB reactivation increases.

Currently there are three commercial test for LTBI:Tuberculin skin test(TST) the time tested tests practised for decades and two relatively recent technique based on the detection of interferon - gamma(IFN-G) released from sensitized lymphocytes against specific antigens of M. tuberculosis: Quantiferon(QFT) and T SPOTS. These are all indirect method of measuring infection by M.tuberculosis.[11]

Active tuberculosis

This particularly applies to disease caused by M.tuberculosis in cancers in the nonneutropenic phases and in countries with high prevalence of TB.[11'12]

TB with patients with different cancer including hematological malignancies often present clinical characteristics that is distinct to those of patients without any underlying disease. The extra pulmonary form is more frequent in these patients and in bone marrow transplant recipients. In addition mortality is higher in the extrapulmonary form.

The diagnostic gold standard for active TB relies on detection of M. tubercuiosis by culture or molecular methods. Nucleic acid amplification tests are increasingly used for rapid diagnosis of TB .One of these GEN XPERT MTB/RIF is endorsed by WHO due to its simplicity of use, high sensitivity and rapidity of diagnosis. Additionally this method detects an eventual resistance to rifampicin in less than two hours.[11-17]

Conclusion

Hodgkin and Non Hodgkin Lymphoma, Acute leukemia both lymphoblastic and myeloblastic and other non hematological maignancies in children have chances of getting the infection with tuberculosis. As with high incidence of tuberculosis in country like ours it is really necessary that a suspicion of TB should always be kept in patient with aberrant lymhadenopathy or unexplained fever not getting cured with conventional antibiotic in patient with cancers particularly the hematological malignancies.

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