

Andrea Thompson

TBIOMD492, Spring 2026

Hepatocellular Carcinoma is a High-risk Side Effect of Thalassemia Disease

Abstract

Thalassemia is characterized by a decrease in hemoglobin protein concentration caused by a single-nucleotide mutation having over hundreds of reported versions and positions. The diagnosis of the disease is based on the subgroup of the protein in which the mutations occur and the severity of the reduction in hemoglobin levels. Thalassemia Major and Intermediate are the two most significant variants for identifying ways to prevent the development of hepatocellular carcinoma. This review analyzes in vitro and in vivo studies to see how the disease itself, as well as the additional confounding events, can increase the chances of developing a secondary cancer such as hepatocellular carcinoma. Blood transfusions, chronic iron overload, hepatitis C, liver disease, and lifestyle choices can all increase the risk. Several strategies have been developed to alter this risk, as many studies have examined pre-treatment, gene editing to reverse mutations, and other approaches to prevent the need for these therapeutic techniques and reduce iron overload. Blood transfusion types and iron chelation therapies have also been experimented with to reduce the amount of iron overload in the liver and prevent the known side effects of liver diseases. Transfusion screenings have also been increased in accuracy to prevent the development of Hepatitis C. Hepatocellular carcinoma is one of the most common cancers, and the diagnosis of thalassemia alone increases that risk percentage because of chronic iron overload. A patient with one or more of the additional side effects can experience an additional increase in risk, but it is known that having the disease with no additional side effects can also lead to the development of secondary cancer.

Thompson Abstract

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Commented [GU2]: check the grammar/sentence structure here. Read it out loud. Something doesn't quite work right.

Commented [GU3]: review this sentence too and edit for clarity. It sounds like the the patient can cause the increased risk, not the side effects. What point are you trying to make? If it's not adding to your point, I would delete this sentence.

Commented [AT4R3]: These are the findings of the paper that the addition of side affects increases the percentage of developing secondary cancer but there is also evidence of developing the secondary cancer even without the additional side affects

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