Effects of Hepatitis C Virus Infection on Genetic Material and on Manifestations of a Related Blood Disease

What is the problem and what is known about it so far?
When many symptoms and laboratory findings occur together without a specific known cause, the grouping is called a “syndrome.” Mixed cryoglobulinemia (MC) is a syndrome characterized by bleeding spots under the skin, weakness, painful joints, and specific abnormalities in one or more organs of the body. A distinguishing feature of MC is the presence of more than the normal number of B lymphocytes (a white blood cell that makes proteins, known as immunoglobulins, that protect us from infection). MC occurs frequently in people infected with hepatitis C virus (HCV). Since HCV infects both liver cells and B lymphocytes, HCV itself may cause accumulation of B lymphocytes. Exactly how this happens is unknown, but the virus sometimes is associated with a rearrangement of chemicals that make up the genetic material in the B lymphocytes (bcl-2 rearrangement). This bcl-2 rearrangement may prolong the lifespan of B lymphocytes and lead to excessive accumulation of these cells in the body. It may also predispose to cancerous transformation of these cells, a condition called lymphoma.

Why did the researchers do this particular study?
To find out how commonly bcl-2 rearrangement occurs in HCV-associated MC and how antiviral therapy (against HCV) might affect manifestations of the disease.

Who was studied?
Thirty-seven patients with HCV and MC were compared to 101 patients who had chronic liver disease due to HCV infection but did not have MC.

How was the study done?
Researchers tested blood from each participant for bcl-2 rearrangement. The clinical characteristics of each patient were then correlated with presence or absence of bcl-2 rearrangement.

What did the researchers find?
Bcl-2 rearrangement was found significantly more often in patients with MC (76%) than in those without MC (38%). Three patients with MC and one patient without MC had developed lymphoma. When two patients with MC (and bcl-2 rearrangement) received antiviral therapy for HCV infection, the virus temporarily disappeared. Although the virus returned after treatment was stopped, B lymphocytes with the bcl-2 rearrangement also disappeared during treatment but reappeared when the virus returned.

What were the limitations of the study?
The methods used to detect the genetic abnormality may have missed some patients with a slight variation in the type of genetic change. This study did not examine additional factors that may be necessary to produce MC or lymphoma.

What are the implications of the study?
HCV infection, which primarily produces liver disease, may be associated with important changes in the genetic structure of other cells (such as blood cells) that can lead to changes in cellular lifespan and may even promote malignancy.