

# HCV Infection on Lymphoid Neoplasm

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**Abstract**

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There are many reports of HCV reactivation prior to the use of rituximab, but few are actually based on large-scale evaluations. In sporadic reports, there are mentions of HCV reactivation and consequent hepatitis, but this is only mentioned in a few large-scale reports [11,19-23]. These reports have also mentioned fatalities caused by hepatitis following HCV reactivation [19,21]. There are few reports discussing large numbers of cases, but a typical example is the report by Ennishi et al. where the incidence of hepatitis in HCV-positive cases was 27%, but the incidence of hepatitis in HCV-negative cases was only 3%, and it was also reported that there were high levels of transaminase in the HCV-positive cases [22]. Arcaini et al. reported that liver damage was observed in 17.9% of HCV-positive cases when using R-CHOP [23], and together with the report by Ennishi et al., it seems that liver damage occurs in roughly 15-30% of cases. These

or through a combination of retrospective and prospective methods [54,55]. It has been reported that the five-year OS and PFS can both be improved [54,55]. However, a report by Michot et al. mentioned the possibility of including cases where diffuse large B-cell lymphoma is thought to have transformed from splenic marginal zone lymphoma [54]. In Europe and the US, there are many cases where splenic marginal zone lymphoma is associated with HCV. These cases are highly responsive to HCV antiviral therapy, suggesting the possibility of an improved prognosis. On the other hand, in the report by Michot et al., the antiviral therapy group included cases where SVR could not be achieved, and the report by Hosry et al. included many cases of cirrhosis, where it is thought that these factors could have a negative effect on OS and PFS [54,55].

13. Macloughlin P, Grillo-Lopez AJ, Link BK, Levy R, Czuczman MS, et al. (1998) Rituximab chimeric anti-CD20 monoclonal antibody therapy for relapsed indolent lymphoma: half of patients respond to a four-dose treatment program. *J Clin Oncol* 16 2825-2833
14. Watanabe T, Tanaka Y (2013) Reactivation of hepatitis viruses following immunomodulating systemic chemotherapy. *Hepatol Res* 43 113-121.
15. Misumi I, Whitmire JK (2014) B cell depression curtails CD4+ T cell memory and reduces protection against disseminating virus infection. *J Immunol* 192 1597-1608
16. Melet J, Mulleman D, Goupille P, Ribourtout B, Waitier H, et al. (2013) Rituximab-induced T cell depletion in patients with rheumatoid arthritis: association with clinical response. *Arthritis Rheum* 65 2783-2790
17. Chang KM, Rehmann B, McHutchison JG, Pasquinelli C, Southwood S, et al. (1997) Immunological significance of cytotoxic T lymphocyte epitope variants in patients chronically infected by the hepatitis C virus. *J Clin Invest* 100 2376-2385
18. Guglietta S, Garbuglia AR, Salichos L, Ruggeri L, Folgosa A, et al. (2009) Impact of viral selected mutations on T cell mediated immunity in chronically evolving and self-limiting acute HCV infection. *Virology* 386 398-406
19. Pitini V, Stumolo G, Arrigo C, Leonardi S, Pino S, et al. (2010) HCV genotype 2 as a risk for reactivation in patients with B cell lymphoma undergoing rituximab combination chemotherapy: correspondence. *Br J Haematol* 150 116-118
20. Margnani M, Mangone M, Cox C, Angeletti S, Veggia B, et al. (2010) HCV-positive status and hepatitis fares in patients with B-cell non-

52. Sultanik P, Klotz C, Brault P, Pol S, Mallet V (2015) Regression of an HCV-associated disseminated marginal zone lymphoma under IFN-free antiviral treatment. *Blood* 125: 2446-2447.
53. Lim LY, La D, Cserti-Gazdewich CM, Shah H (2015) Lymphoma remission by interferon-free HCV eradication without chemotherapy. *ACG Case Rep J* 3: 69-70.
54. Michot JM, Canioni D, Driss H (2015) Antiviral therapy is associated with a better survival in patients with hepatic C virus and B-cell non-Hodgkin lymphomas. ANRS HC-13 Lympho-C Study. *Am J Hematol* 90: 197-203.
55. Hosry