

**Abstract Submission No. : IL-9129**

## **Malignancy in Glomerulonephritis**

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The association between glomerular disease and cancer had been recognized by some case reports in the early 20th century; Galloway and Cornig reported the cases with Hodgkin lymphoma and overt proteinuria, respectively. In 1966, Lee et al. demonstrated the associations between cancer and nephrotic syndrome for the first time; most cases in the study were diagnosed as membranous nephropathy (MN). After then, the association of MN with solid tumors and minimal change disease(MCD) with Hodgkin's disease has been well accepted by many researchers. Furthermore, some other kinds of glomerular diseases were also found to be related to malignancy, including membranoproliferative glomerulonephritis, IgA nephropathy, and ANCA-associated vasculitis. Recent studies of glomerulonephritis (GN) registry revealed an overall increased risk of cancer in patients with GN compared to the general population. From these literatures, various cancer types are observed in patients with GN, including solid tumors such as lung cancer, colorectal cancer, and prostate cancer as well as hematologic malignancies such as lymphoma, chronic lymphocytic leukemia.

To date, many studies have evaluated cancer-associated glomerulonephritis primarily as paraneoplastic syndrome. However, glomerulonephritis and malignant tumor share common risk factors such as chronic viral infections, and immunosuppressive agents used in the treatment for GN could be related to the cancer occurrence. Cancer can develop several years before or later than GN diagnosis. In particular, membranous nephropathy was found to be related with long-term risk of cancer (5-10 years after renal biopsy). These findings suggest that cancer surveillance of cancer is required for a quite long time.

All these studies were mainly conducted in the Western populations, so recently published studies in the Korean population could provide valuable insights into the cancer epidemiology in Asian patients with GN. In this study, 822 Korean patients with biopsy-proven GN who were followed for about 5 years, 45 patients (5.5%) developed de novo cancer. Patients with GN had a higher risk of cancer relative to the general population, particularly in MN, IgA nephropathy, lupus nephritis, and focal segmental glomerulosclerosis. The most common cancer types were colon cancer, hepatocellular carcinoma, and papillary thyroid carcinoma. MN diagnosis was a significant risk factor for cancer development and patients diagnosed with cancer had a 6.6 times higher risk of mortality among MN patients. These findings could be evidence of cancer surveillance strategies to improve outcomes in the GN population. In the future study, antigens presumed to be related to cancer in MN such as thrombospondin type-1 domain-containing 7A and Neural epidermal growth factor-like 1 will need to be evaluated in this topic.

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