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Cancer with a Known Cause

BY ELIZABETH WHITTINGTON

Although most cases of MDS have an unclear cause, called primary or de novo MDS, about 20 percent of patients develop secondary MDS—when the disease is caused by chemotherapy or radiation used to treat a previous cancer. Chemical exposure from benzene and other toxic chemicals have also been known to cause secondary MDS. Unfortunately, patients with this form of MDS usually do not respond as well to treatment and have a worse prognosis than patients with primary MDS. There is also no standard therapy for patients with secondary MDS.

Secondary MDS is mostly found in patients treated for lymphoma or leukemia with chemotherapy combinations, but survivors of breast cancer, prostate cancer and colon cancer, among others, can also be affected. Alkylating agents, such as Cytosan (cyclophosphamide), Alkeran (melphalan) and Myleran (busulfan), as well as VePesid® (etoposide), Vumon (teniposide) and topoisomerase inhibitors are the most well-known chemotherapy culprits.

Current research is hoping to find genetic alterations that will help provide better treatment options for patients with secondary MDS since studies have shown that up to 90 percent of secondary MDS patients have chromosomal mutations in their DNA. Chromosomal abnormalities caused by alkylating agents usually appear in chromosomes 5 and 7 and can develop into MDS over several years, while MDS caused by topoisomerase inhibitor exposure appears sooner as mutations in chromosome 11.

Currently, there is no way to identify patients who have a high risk of secondary MDS. Studies have shown that different mutations confer prognostic information, which may help patients decide between treatment options. In the future, these specific alterations could be used as biomarkers to determine risk of the disease and detect additional cancer cells after treatment.