Appearance of estrogen positive bilateral breast carcinoma with *HER2* gene amplification in a patient with aplastic anemia

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Immunosuppressive therapy is one of the standard therapy protocols for aplastic anemia (AA). However, immunosuppressive therapy and androgenic steroids can promote development of solid tumors such as squamous carcinoma, head and neck tumors, adenocarcinoma of the stomach, hepatocarcinoma and breast carcinoma in long surviving patients with aplastic anemia. We present here a rare case of a 56-year-old woman in whom bilateral adenocarcinoma of the breast developed 11 years after the start of immunosuppressive and androgenic steroid therapy for aplastic anemia. Histological examination showed invasive ductal carcinoma with intense nuclear staining for estrogen receptors. HER2 immunohistochemistry was positive for 80% of stained cells, and chromogenic *in situ* hybridization showed a high level of *HER2* gene amplification. This case indicated that a new therapy option is needed for estimation and evaluation to avoid the consequence of cancer occurrence.

Key words: aplastic anemia, immunosuppressive therapy, breast cancer, histology, immunohistochemistry, estrogen receptors, HER2, survival, cancer, chromogenic *in situ* hybridization (CISH).

Introduction

It is well known that long-term survivors of acquired aplastic anemia (AA) may develop hematologic or non-hematologic malignant diseases [1-3]. Immunosuppressive therapy with or without antithymocyte globulin and cyclosporine A is the standard treatment for aplastic anemia [1, 3].

In addition, the risk of acute leukemia is very high especially in those patients who received multiple courses of immunosuppressive chemotherapy during treatment of aplastic anemia [3, 4]. The risk for solid malignant tumors is lower but there have been observed squamous carcinoma of the neck and head, adenocarcinoma of the stomach, hepatocarcinoma and breast tumors [5]. The development of breast cancer has been reported more frequently after treatment of Hodgkin's lymphoma [6]. Here we report a case of bilateral breast carcinoma in a 56-year-old woman which developed 11 years after treatment of aplastic anemia with immunosuppressive therapy and androgens.

Case report

A 46-year-old woman presented in December 1996 with profound hemorrhagic syndrome mani-