tumor, commonly diagnosed in advanced stage and in the elderly. For localized disease a wide variety of management strategies can be used. Despite the large series of recent retrospective analyses the main question of which treatment modality is best remains unknown.

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# Electrolyte abnormalities due to irinotecan administration in metastatic HER-2 positive breast cancer patients

Dear Editor,

Irinotecan is a topoisomerase-1 inhibitor, used widely in colon cancer and other malignancies. Among the most commonly reported side effects are diarrhea and immunosuppression [1]. However, the physician should also be aware of the less common side effects. Herein we present a case with resistant hypokalemia and hypocalcemia associated with the use of irinotecan in a patient with chemoresistant breast cancer.

A 57-year-old postmenopausal female patient was diagnosed with infiltrative ductal carcinoma of the left breast (T2N0M0) in January 2007. She received 6 cycles of adjuvant cyclophosphamide-adriamycin-5-fluorouracil. In January 2008 a HER-2 positive cancer developed in the contralateral breast for which neoadjuvant paclitaxel-trastuzumab regimen was initiated. Right mastectomy in July 2008 revealed infiltrative ductal carcinoma and the patient was administered adjuvant trastuzumab for about 9 months. During her follow-up metastatic lesions developed on the chest wall and she received multiple lines of chemotherapy including capecitabine, lapatinib, vinorelbine, carboplatin, docetaxel and trastuzumab due to ever occurring progressive disease. She also received palliative irradiation to the chest wall. Her treatment was switched to irinotecan 60 mg/m$^2$ every 2 weeks and trastuzumab 2 mg/kg on days 1, 8, 15, 22) in January 2012.

On the 6th week of treatment diarrhea and neutropenic fever necessitated administration of sulbactam-ampicillin and ciprofloxacin. Consistent with acute prerenal kidney injury her creatinine was 3.5 mg/dL at the time of hospital admission. Since stool studies including direct examination, culture and *C. difficile* antigen testing showed no positive results the diarrhea was attributed to irinotecan, and loperamide with hydration were recommended. Upon normalisation of creatinine levels, the patient developed hypokalemia (2.5-3.0 mEq/L) and hypocalcemia (5.5-6.5 mg/dL) which did not resolve despite replacement. Serum magnesium was as low as 0.52 mg/dL and urinary excretion of magnesium was 116 mg over 24 h (reference 6.1-20.7 mg/day). After appropriate intravenous replacement of calcium and magnesium, the patient was discharged with oral maintenance. On her polyclinics visit one month later, no electrolyte abnormality was present.

Several chemotherapeutic agents are associated with electrolyte disturbances. Nausea and vomiting-common chemotherapeutic side effects-may also contribute to these problems. As reported by some studies resistant hypokalemia and hypocalcemia are not frequent after irinotecan administration [1]. Puduvalli et al. reported grade I or II hypokalemia and hypomagnesemia with irinotecan and thalidomide in patients with glioblastoma multiforme. In another phase II study by Bathe et al. irinotecan caused hypokalemia in just one out of 35 patients with colorectal cancer [2].

The prementioned electrolyte disturbances might have life-threatening consequences in patients under chemotherapy. Thus, we recommend close monitoring of electrolytes in patients receiving an irinotecan-containing chemotherapy regimen.

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