Use of liquid biopsy in early detection of metastatic relapse and chemotherapy response in muscle-invasive bladder cancer patients

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INTRODUCTION AND OBJECTIVE: Circulating tumor cells (CTCs) from liquid biopsies have been studied as a potential biomarker involved in the metastasis development, having promising results. The main goal of our study was to evaluate CTC content in liquid biopsies as a tool for monitoring patients with muscle-invasive bladder cancer (MIBC) after cystectomy and determine their response to the adjuvant chemotherapy.

METHODS: A total of 40 patients with localized MIBC who underwent cystectomy between 2018 and 2019 in our center were prospectively included. Blood samples were collected before surgery and one, four, twelve and twenty-four months after surgery. CTCs were isolated from blood samples through IsoFlux system. CTC counting was performed using immunohistochemistry staining and a fluorescence microscope.

RESULTS: Fourteen out of 40 patients (35%) developed tumor progression during follow up (median follow up 15 months). The mean time to tumor progression was 6
No statistically significant differences were found in the CTC counting between progressive and non-progressive patients neither at the time of cystectomy ($p=0.708$) nor one month after cystectomy ($p=0.697$). However, CTC counting was significantly higher in progressive than in non-progressive patients at four months after surgery ($p=0.035$).

Of note, 70% of progressive patients showed a significant increment of CTC number ($p=0.024$) in a median of 3 months before the radiological progression.

All patients receiving adjuvant chemotherapy did not develop tumor progression and showed a significant reduction of CTC number during the follow-up after chemotherapy ($p=0.001$).

CTC counting at one and two years after surgery is in progress.

**CONCLUSION:**
CTC content in liquid biopsy appears to be a useful tool for early prediction of tumor progression and to determine the therapeutic efficacy of adjuvant chemotherapy. Larger follow-up of this series analyzing their CTC profile (currently in progress) will help us to establish the real utility of CTC counting in routine clinical practice.

**Fig.** Longitudinal representation of CTCs counting results for all analyzed samples.