Ex vivo expansion of circulating tumor cells for individualized drug susceptibility in patients with advanced or recurrent esophageal cancer

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**Background:** Esophageal cancer (EC) is the eighth most common cancer in the world. The incident rate of EC is significantly high in Asian countries compared to rest of the world. Circulating tumor cells (CTCs) derived from EC have the potential to be precursors of metastasis. It is therefore of paramount interest to isolate and characterize CTCs from EC patients to monitor and detection of recurrence. The aim of present study is to evaluate drug response using patient-derived CTC cultures obtained from EC.

**Methods:** Custom microfabricated tapered microwells will be integrated with microfluidics to expand CTC clusters without any prior pre-enrichment. The established CTC cluster assay will be used to screen anticancer drugs. The drug concentrations selected will be centered on the IC50 that had previously established for each drug across EC cell lines. Cluster formation in culture will be correlated with overall patient survival. 50 patients with a proven diagnosis of EC attending the Department of Surgical Oncology, Kidwai Institute of Oncology will be enrolled into the study.
Results: Our initial results showed CTC clusters formation in the patients with metastatic EC. This cluster formation was affected by the presence and duration of systemic therapy. We observed a progressive reduction in cluster formation in samples from patients who had undergone increasing longer treatment.

Conclusions: Our result suggests that CTC cluster can be used to rapid evaluation of drug response. We would further use the CTC cluster assay as a potential tool for evaluating patient prognosis during treatment. The study will be employed to determine the drug susceptibility pattern in individual patients and also provide therapeutic choices for personalized treatment.

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