**Introduction and Aims:** INTRODUCTION: The principal concern limiting the Peritoneal Dialysis (PD) use regards the technique survival due to the loss of peritoneal membrane function. The mesothelial-mesenchymal transition (MMT) processes by which peritoneal mesothelial cells acquire a myofibroblast-like phenotype, leading to peritoneal fibrosis, represents the key factor in PD failure. It is known, that phenolic extracts obtained from extra virgin olive oil (PL-EVOO), energy source of Mediterranean diet, possesses anti-inflammatory and anti-oxidant properties and could counteract the EMT process and angiogenesis in several cellular systems. The aim of the study is to test in vitro whether PL-EVOO administration could prevent and/or reverse the MMT process induced by PD, increasing peritoneal survival. The purpose of this study was to test in vitro if the PL-EVOO mitigates the process of MMT induced by the chronic exposure with dialysate (DL).

**Methods:** Immortalized human mesothelial cells (IMC); Peritoneal mesothelial cells (MC) isolated from effluents by centrifugation of dialysis fluid taken from 10 PD patients that were stable and regularly followed-up at our Department. Western blot (WB); real-time-PCR; wound-healing and scratch trans-well migration assays.

**Results:** Firstly, the purity of the MC was determined by the expression of intercellular adhesion molecule-1 (ICAM-1). MC have been classified in "Epithelioid-like" and "Fibroblast-like" according to the MC cellular morphology and to the expression levels of epithelial marker, Cytokeratin-18, by flow-cytometry. Real-time PCR and the WB analysis results showed that in IMC the co-treatment with DL + PLEVOO, mitigated the genic and protein up-regulation of TGF-β1, N-cadherin, Fibronectin, αSMA and Vimentin, as well as of inflammatory markers as COX-2, MCP-1 and TNF-α.

Concomitantly, cell migration assays showed that the co-treatment reduced the migratory capacity of IMC observed upon stimulation with only DL. On the contrary, we observed that in MC Fibroblast-like cells, PLEVOO exposure was not able to significantly mitigate the expression levels of the above reported mesenchymal and proinflammatory markers.

**Conclusions:** Our data demonstrated that PL-EVOO could exerts a protective effect on chronic damage induced by DL on mesothelial cells before they have acquired the "Fibroblast-like" phenotype.