Background
To investigate ultrasound features and the best cut-off value of CA125/CEA ratio to discriminate primary ovarian carcinomas from metastatic tumors in selected groups of morphological ovarian masses: multilocular masses ≥5 locules and multilocular-solid lesions.

Methods
Patients with multilocular (≥5 locules) or multilocular-solid ovarian masses, operated on within three months from ultrasound, and tumor markers (CEA and CA125) available at diagnosis were retrospectively identified from three ultrasound centers. The masses were described using the IOTA terminology.

Results
On histology, 197 were primary ovarian carcinomas and 46 were metastatic tumors. On ultrasound, primary ovarian carcinomas were smaller than metastatic tumors (median of the largest diameter was 112, range 22-290 vs 146, range 43-259). Although the vast majority of both primary ovarian carcinoma (191/197, 97%) and metastatic tumors (34/46, 73.9%) were multilocular-solid masses, a lower number of primary ovarian carcinomas were described as multilocular than metastatic tumors (6/197 vs 12/46; 3% vs 26.1%). A lower number of tumors containing >10 locules was found in primary ovarian carcinoma group (35/197, 17.8%) than in metastatic group (25/46, 54.3%). Among patients with multilocular-solid masses, papillary projections were found in 34/191 (17.8%) of primary ovarian carcinomas and in 2/34 (5.8%) of metastatic masses (p=0.003). ROC curve analysis showed that the best cut-off value of CA125/CEA ratio was 19.7 for discriminating primary ovarian carcinomas versus ovarian metastases, and the predictive performance of CA125/CEA >19.7 for primary ovarian carcinomas was: AUC of 0.856 (95%CI 0.800 - 0.913), sensitivity 87.3% and specificity 67.4%.

Conclusion
Primary ovarian carcinomas differ from metastatic ovarian tumors when considering masses with multilocular or multilocular-solid morphology on ultrasound, and CA125/CEA ratio can help to discriminate them.