



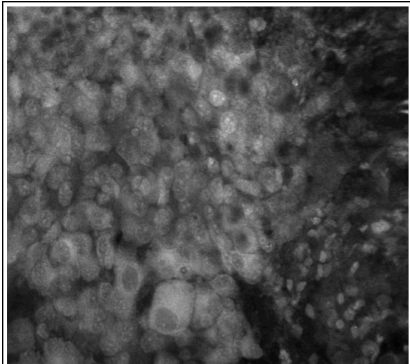
Confocal laser endomicroscopic (CLE) characterization and differentiation of brain metastasis.

Cleopatra Charalampaki MD, PhD
Department of Neurosurgery
Hospital Cologne, Merheim
Cologne, GERMANY

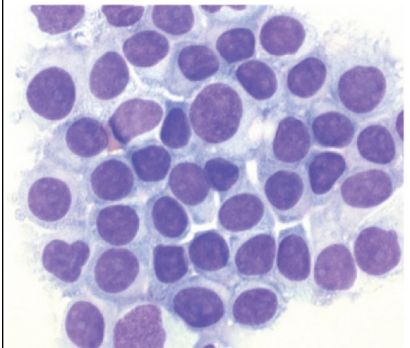


Introduction

Metastasis are among the most common mass lesions in the brain. Histopathological criteria for differentiation brain metastasis originate from their morphological appearance. Aim of this study was to investigate the accuracy of the CLE technique in analyzing histological patterns of different brain metastasis originated from different organs. Furthermore, we tried to find out the primary tumor according the confocal endoscopic histopathological patterns in comparison with the HE stains of the original tumor.



Ductal metastasis confocal view



Ductal metastasis HE stain

Methods

We used the intraoperative CLE technique to analyze different brain metastasis originated from different organs of the body. The patients were surgical treated as usual. The metastatic biopsies were staining with topical application of 0.1ml acriflavine. Furthermore, we analysed with the CLE technique biopsies taking from the primary tumor of origin, and compared those with the CLE pictures generated from the brain metastasis.



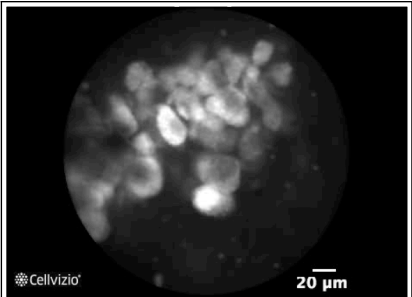
Setup in the OR



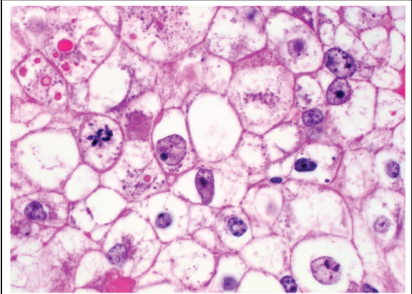
Picture in picture view endoscope -confocal

Results

We analyzed 45 brain metastasis originated from lung, prostate, different parts of the gastrointestinal tract, breast tissue, and urogenital tract. Every type of metastasis could be defined with the CLE technique. The CLE pictures showed the same histomorphological findings as in the HE staining. Furthermore, we achieved a high accuracy of the confocal image of the metastasis compared with the confocal image of the primary tumor. The differentiation and classification under CLE view of the metastasis and also the affiliation to the organ of origin was possible.

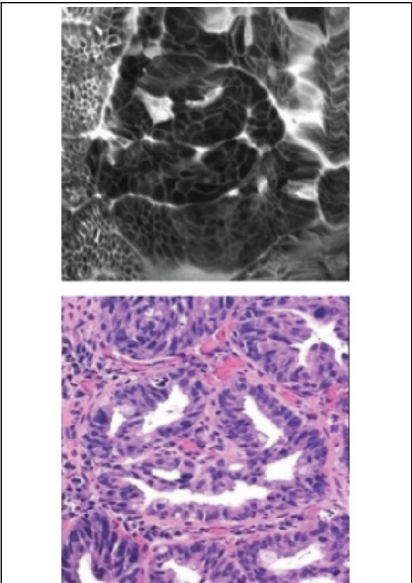


Hypernephroma confocal view

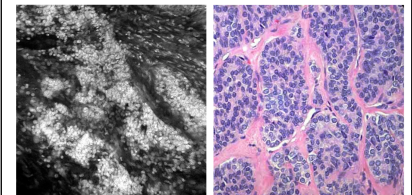


Hypernephroma HE stain

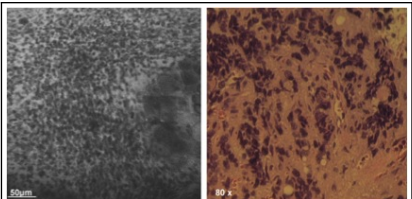
Different examples of metastatic tumors confocal view and HE stains



Prostata CA metastasis
confocal and HE stain



Thyroid metastasis confocal view (left), and thyroid cancer HE stain (right)



neuroendocrine tumor
confocal view and HE stain

Conclusions

With the CLE technique it is possible to characterize and define brain lesions as metastatic tumors regarding their histological confocal appearance. Furthermore, we were able to differentiate brain metastasis in vivo from each other. Because of the high accuracy of the confocal image of the metastasis when compared with the confocal image of the primary tumor this technique might be able in the future to define the organ of origin according to histomorphological architecture of the confocal image.

Learning Objective
Confocal laser endomicroscopy shows how it will be possible to operate on a cellular level.