



Standardization of Technical Process for Cell Block Preparation in Cytology

M. D'Angelo¹, L. Leone¹, T. Poggi³, A. Maggioni⁴, G. Gragnano², F. Pagni⁴, A. Eccher³, A. Iaccarino², R. Virgili¹, G. Perrone¹

¹Fondazione Policlinico Universitario Campus Bio-Medico di Roma

²Università degli Studi di Napoli Federico II

³Università degli Studi di Modena e Reggio Emilia

⁴Università degli Studi di Milano-Bicocca

Objectives

Cytology plays an essential role in diagnosing and managing diseases, being a low-cost and effective diagnostic tool. However, traditional morphology-based cytology has limitations, especially in the age of precision medicine, notably lack of standardization in specimen processing across laboratories. This study aims to establish a standardized protocol for cytological sample preparation that is comparable to existing methods in individual labs.

Results

The synthetic matrix method was easy for all operators to use, resulting in significantly reduced sample handling compared to previous methods. In terms of adequacy, both NEW and OLD methods identified 2 samples as insufficient. Moreover, 12/41 samples (OLD) and 22/41 samples (NEW) had good adequacy, while 27/41 (OLD) and 17/41 (NEW) were rated as excellent. Regarding diagnoses, 8 samples classified as "neoplastic" and 29/31 samples as "non-neoplastic" using the OLD method were confirmed with the NEW method.

Materials and Methods

Here we present preliminary data of a prospective multicentric study. 41 cytological specimens were prepared using two methods: the NEW method (synthetic matrix) and the OLD method (traditional protocols of individual laboratory involved). The samples comprised 22 ascitic fluid, 17 pleural fluid, 1 neck cyst fluid, and 1 pericardial fluid. Cytological adequacy and diagnosis were assessed for all samples, with adequacy was scored as 1 (insufficient), 2 (good), and 3 (excellent); diagnoses were categorized as 1 (non-diagnostic), 2 (non-neoplastic), and 3 (neoplastic).

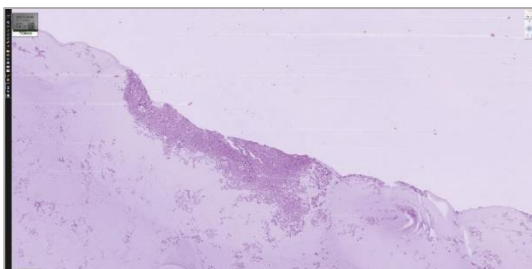
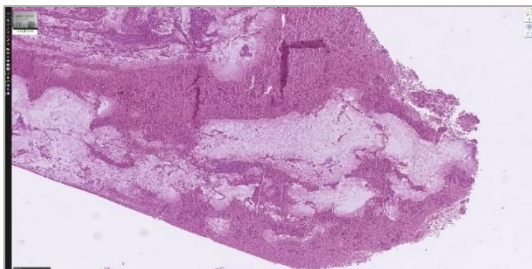
Conclusions

Preliminary results indicate that the synthetic matrix method effectively preserves cellularity in cytological samples. It minimizes handling and processing time while maintaining comparable adequacy and accuracy in diagnosis. Enhancing cytology-based molecular profiling could substantially improve patient care by providing safe, rapid, and accurate tumor characterization, thereby guiding therapy and advancing the field of molecular-targeted treatments.



The synthetic matrix

OLD methods



NEW method: synthetic matrix

