

INKING CELLBLOCKS IMPROVES SCANNER DETECTION FOR PRIMARY DIAGNOSIS

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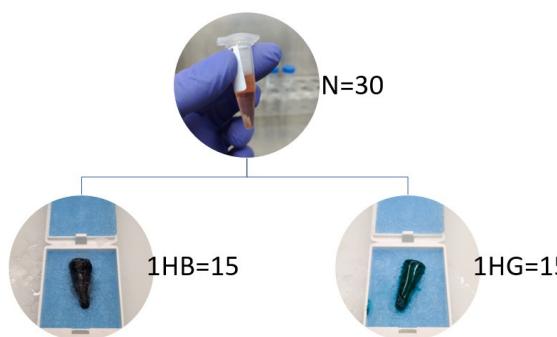
INTRODUCTION

Cellblock transforms liquid-based cytology in a pellet-cone to be processed and used for immunohistochemistry (IHC). Cellblock's matrix is transparent and often hard to be automatically detect by the scanner (ADS), generating incomplete whole slide images (WSIs).

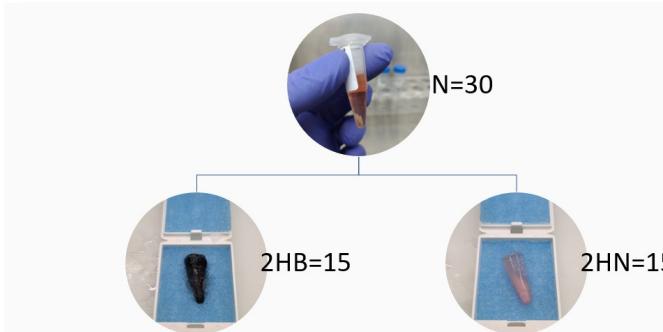
METHODOLOGY

Tests were designed to evaluate if inking cones after bronchus cytology facilitates ADS.

First test: 15 cellblocks were sectioned, one half inked green (1HG) and the other inked black (1HB). One haematoxylin-eosin (HE) slide was produced from each half-cone.



Second test: 15 cellblocks were sectioned, one half inked black (2HB) and the other left unstained/null (2HN). HE and Cytokeratin AE1AE3 IHC slides were produced from each half-cone. Slides were evaluated by 3 pathologists.



RESULTS

First test: All sections were ADS; one 1HG was rescanned (6.7%)($p=0.317$), scanning 1HBs was faster ($\text{mean}\pm\text{sd} ; 62.3\pm19.7\text{s}$ vs $72.1\pm21.5\text{s}$)($p=0.022$) and lighter to archive ($367.3\pm81.4\text{Mb}$ vs $400.2\pm99.0\text{Mb}$) ($p=0.041$) than 1HGs; WSI quality was similar regardless the colour; ink interference at the limits of the section was frequent in 1HGs ($p<0.0001$).

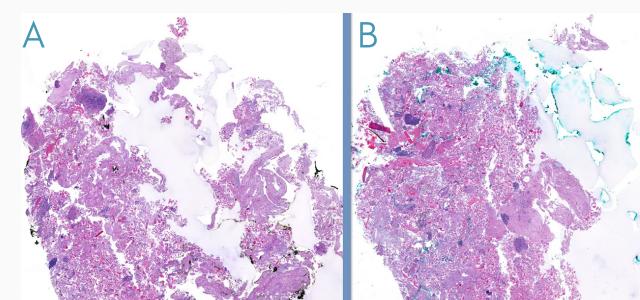


Image 1 - Comparison between ink interference in 1HB and 1HG. Interference of the ink is more evident in 1HG. [A] WSI of 1HB stained with HE (2x); [B] WSI of 1HG stained with HE (2x).

Second test: All HEs were ADS; two 2HNs were rescanned (13.3%)($p=0.157$), scanning time ($75.8\pm14.4\text{s}$ vs $69.5\pm21.0\text{s}$)($p=0.125$) and archive consumption ($373.8\pm63.6\text{Mb}$ vs $351.2\pm79.3\text{Mb}$) ($p=0.164$) was similar for 2HBs and 2HNs, respectively;

WSI quality was similar regardless inking; ink interference was not relevant ($p=0.063$). In IHC, one 2HB (6.7%) and 8 2HNs (53.3%) were not ADS ($p=0.016$), scanning 2HNs was faster ($76.1\pm13.7\text{s}$ vs $81.3\pm18.0\text{s}$)($p=0.001$) and lighter to archive ($165.7\pm58.1\text{Mb}$ vs $369.7\pm140.8\text{Mb}$)($p=0.001$) than 2HB's; WSI quality was equivalent regardless inking; ink interference was recorded($p=0.001$).

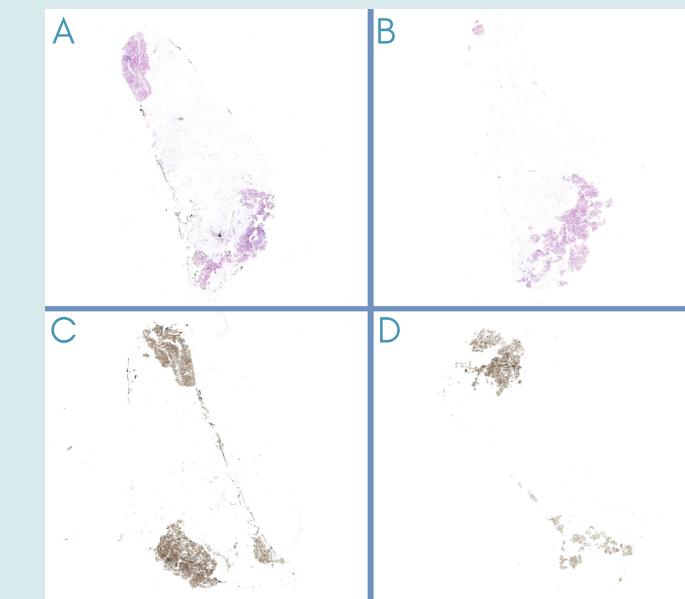


Image 2 - Comparison between the WSIs obtained in the 2HB and 2HN. [A] WSI of 2HB stained with HE (0.5x); [B] WSI of 2HN stained with HE (0.5x); [C] WSI of 2HB imunostained with cytokeratin AE1/AE3 (0.5x); [D] WSI of 2HN imunostained with cytokeratin AE1/AE3 (0.5x).

CONCLUSION

Inking cellblocks improves scanner detection and allows the production of quality WSIs for diagnosis.