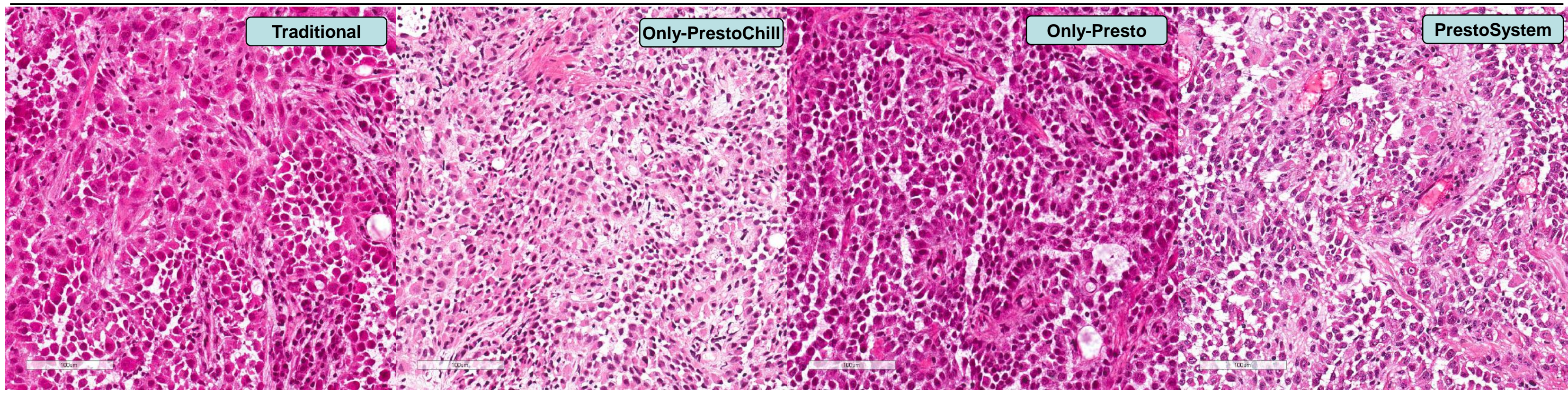


Cryoembedder, automatic processor/stainer, liquid nitrogen freezing, and manual staining for frozen section examination. A comparative study.

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Figure 2. Histology Comparison



Microphotograph of a malignant mesothelioma of the peritoneal cavity (case 19). PrestoSystem was scored excellent in all parameters by both pathologists. Diagnosis feasibility was considered satisfactory or excellent for all conditions. Only-Presto and PrestoSystem had a higher score in cytology and staining compared to traditional and Only-PrestoChill.

ABSTRACT

Background. Frozen section examination (FSE) has changed surgical pathology and patient management. However, this technique is burdened by artifacts that limit the evaluation. Efforts have been made to reduce these artifacts, mostly through improving specimen freezing. We qualitatively analyze a commercial system, composed by a cryoembedder and a processor/stainer, comparing it to our current technique. **Methods.** Twenty-seven specimens were analyzed under the following freezing (F) and staining (S) conditions: liquid nitrogen F and manual S (Traditional), liquid nitrogen F and automatic processor/stainer, cryoembedder and manual S, and cryoembedder and automatic processor/ stainer (PrestoSystem). Feasibility of diagnosis as well as overall architecture, cytology, and staining were scored. Scores of the for conditions were compared. **Results.** We observed less variation in scores of Prestosystem compared to Traditional. Specimens scoring inadequate in diagnosis were all frozen in liquid nitrogen. PrestoSystem improved the diagnosis score in 45% of cases compared to Traditional. **Conclusions.** PrestoSystem was always equal or better in diagnosis compared to traditional technique. The freezing process is the most critical step.

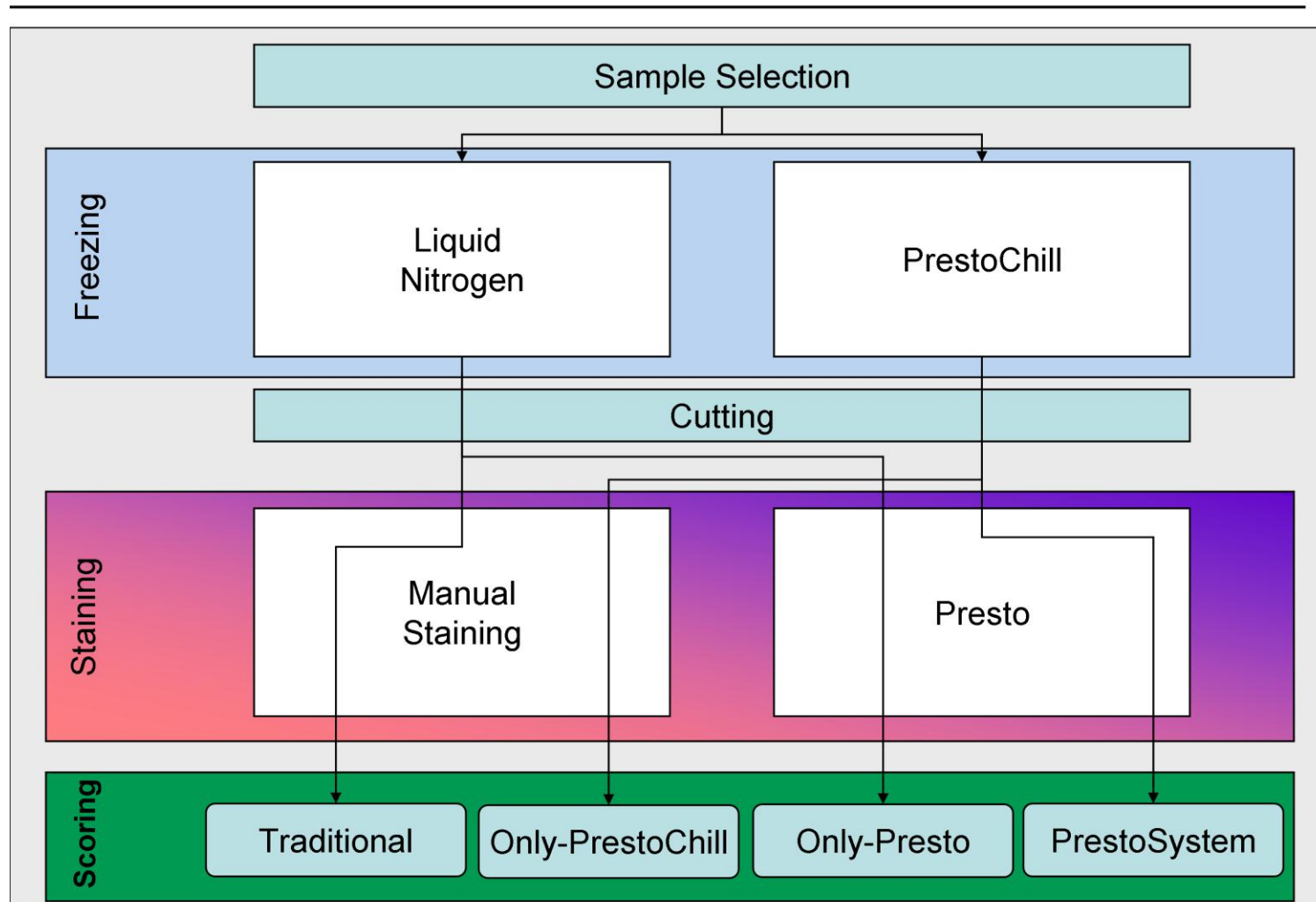
OBJECTIVES

Since FSE can be burdened by limiting artifacts, in order to foresee improvements in pre-analytical phase we qualitatively analyze a commercial system, composed by a cryoembedder and a processor/stainer, comparing it to our current technique.

METHODS

Twenty-seven neoplastic specimens underwent the following conditions: Traditional (liquid nitrogen freezing and manual staining), only-Presto (liquid nitrogen freezing and commercial processor/stainer (Presto, Milestone Diagnostic, Italy)), only-PrestoChill (cryoembedder (PrestoCHILL, ibidem) and, manual staining), and PrestoSystem (cryoembedder and processor/ stainer). Two pathologists scored feasibility of diagnosis as well

Figure 1. Methods, Study Design



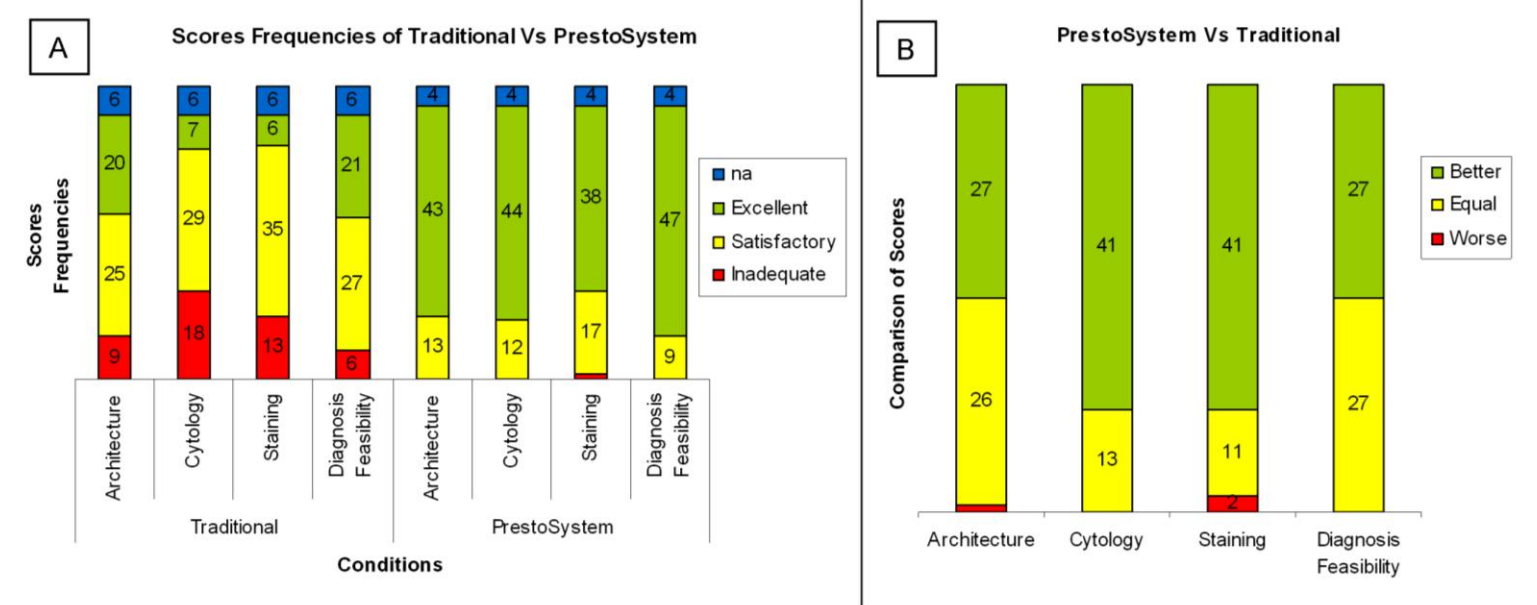
as overall architecture, cytology, and staining, using a three-level score (inadequate; satisfactory; excellent) (Fig. 1). Pathologists' agreement as well as comparison between PrestoSystem, Only-PrestoChill and Only-Presto Vs Traditional conditions were studied (Fig. 2).

RESULTS

Pathologists had substantial agreement on diagnosis feasibility, comparing inadequate score Vs all the others (Cohen's Kappa score: 0.654, P-value <.001).

Diagnosis scored satisfactory or excellent in 211/220 cases (96%); architecture, cytology, and staining scored inadequate 12 (5%), 23 (10%), and 24 (10%) cases, respectively. All specimens inadequate for diagnosis (N=9) were frozen in liquid nitrogen, 6 (6/9) were in the Traditional group.

Figure 3. Comparison between PrestoSystem and Traditional



Panel A shows the scores comparing PrestoSystem Vs Traditional for each scoring category; PrestoSystem most consistently excellent scores in all the categories. **Panel B** shows the comparison of scores in the different categories between PrestoSystem and Traditional.

We observed less variation in scores of PrestoSystem compared to Traditional (Fig. 3A). PrestoSystem scored equal or better than Traditional, improving the diagnosis feasibility score in 27 cases (45%); moreover, scores for cytology, staining and architecture were significantly better for PrestoSystem than Traditional (χ^2 test; all P-value <.001) (Fig. 3B). Presto System scores were always equal to or better than Only-Presto or Only-PrestoChill in diagnosis feasibility.

Only-Presto and Only-PrestoChill had better scores in Diagnosis Feasibility than Traditional in 11(20%) and 16 (30%) cases, respectively. Compared to traditional Only-Presto influenced staining, architecture and cytology scores, improving them in 24 (44%), 14 (26%) and 21(39%) cases respectively. Similarly Only-PrestoChill improved architecture, cytology and staining scores in 22 (41%), 32 (59%), and in 21 (39%) cases respectively.

Compared to Only-Presto, Only-PrestoChill improved diagnosis score in 9 cases (17%). Architecture and cytology scores was comparable between Only-Presto and Only-PrestoChill, but there was a trend for higher scores in the latter

CONCLUSIONS

The commercial system analyzed, composed by a cryoembedder and a processor/stainer, was always equal or better in diagnosis compared to traditional technique and gave also more reproducible results.

Freezing could be a major limitation since all the specimen inadequate for diagnosis underwent liquid nitrogen freezing, and specimens that underwent cryoembedder and manual staining did better than the ones that did liquid nitrogen freezing and processor/stainer.



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