

Chemotherapy naive breast cancer: a correlation study between BD Cytorich™ Red cell blocks and formalin- fixed paraffin- embedded tissue blocks

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Background

- Breast cancer the most common among women
- Triple test
- FNAB
- Cell block
- Numerous sections can be cut to facilitate ancillary test (immunochemistry, molecular, ISH)

Case Selection

- Patients with a primary cytological diagnosis of breast carcinoma
- ER, PR and HER2 ICC stains performed on BD Cytosch™ Red cell blocks

2013 - 2015

- 609 patients with a primary diagnosis of breast carcinoma
- 285 (47%) no histology follow up
- 132 (22%) histology done after chemotherapy administration
- 40 (7%) no cells or too few cells on cell blocks
- 20 (3,5%) cytological specimens could not be retrieved from the departmental archives
- **132 (22%) considered suitable for this study**

Aim:

To validate the cell block
technique currently used in our
laboratory

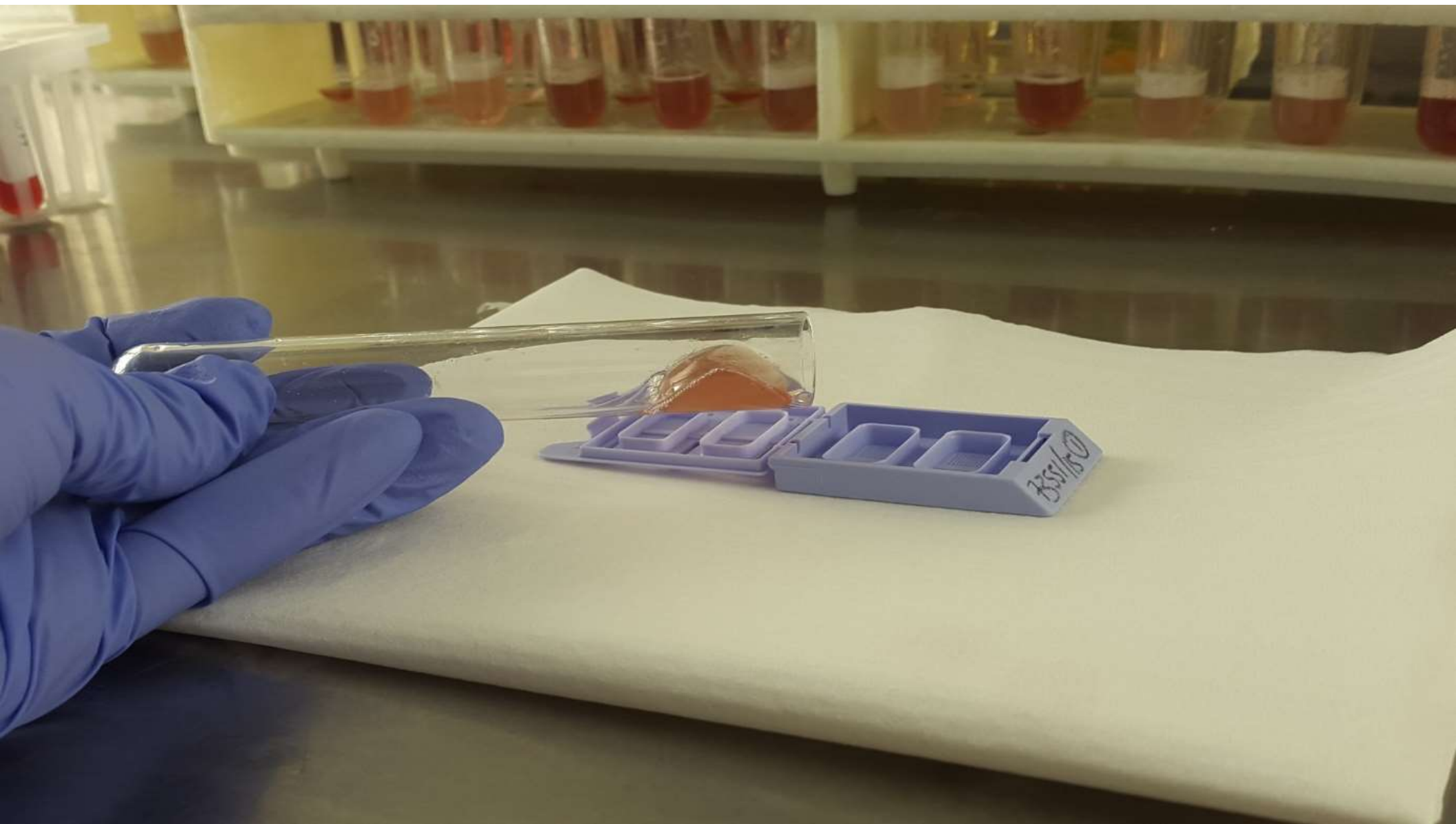
Research questions

- Is the cell block technique comparable to tissue blocks, considering ER, PR and HER2 immunostains?
- Is cytology grading comparable to histological grading?

Materials & Methods

BD Cytorich™ Red Cell block Methodology

- Sample collected in BD Cytorich™ Red preservative fluid
- Centrifuge (10min; 1500 rpm)
- Decant supernatant
- *Plasma (3 – 4 drops)*
- *Dade innovin (3 – 4 drops)*
- Clot formation
- Transfer clot to cassette
- Processed in the same manner as histological tissue (FFPET)
- ER, PR and HER2 staining done on cell block and tissue block sections were scored accordingly



Results:

- Cell Block cellularity
- ER & PR proportion
- ER & PR intensity
- HER2 analysis
- Cytology grading

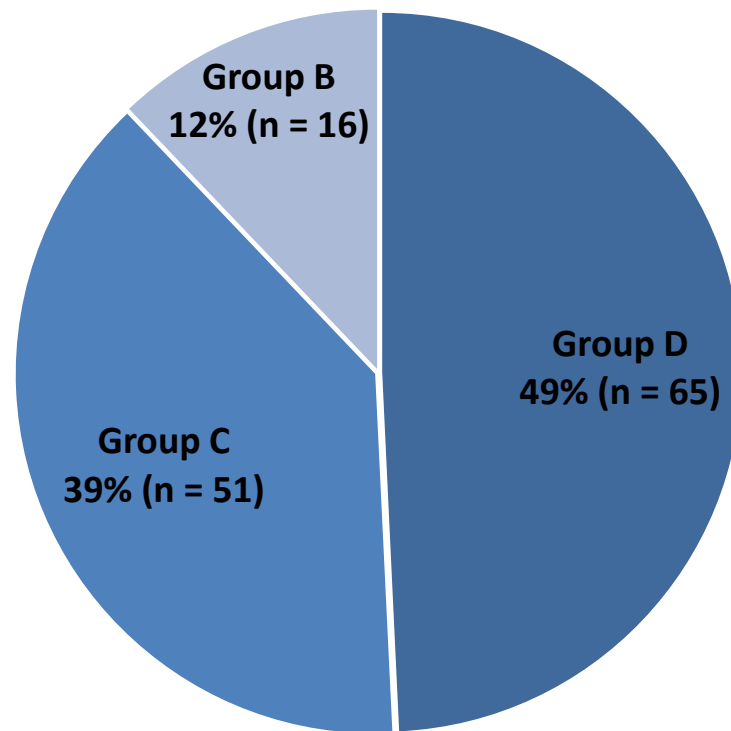


Sensitivity & Specificity

Cell block cellularity: Scoring system

Score	Cellularity
A	Less than 20 cells
B	20 or more cells, less than 100 cells
C	100 or more cells, less than 1000 cells
D	1000 or more cells

Results: Cell block cellularity



Cell block: ER & PR Proportion

Score	ER and PR Proportion
0	Less than 10% tumour cells staining
1	10% or more, less than 30% tumour cells staining
2	30% or more, less than 60% tumour cells staining
3	60% or more tumour cells staining

Tissue block: ER & PR Proportion

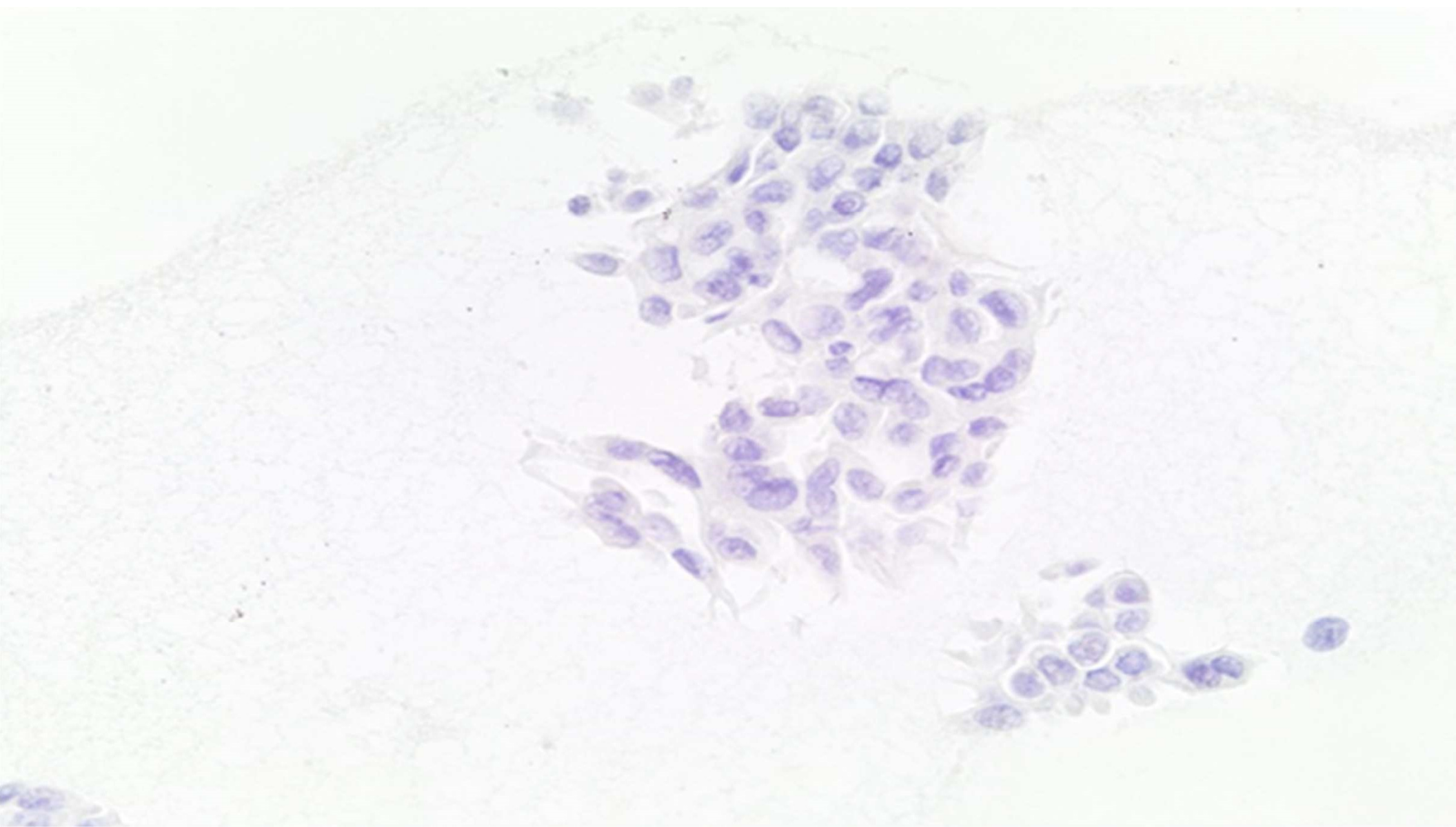
Score	Proportion
0	No staining
1	<1%
2	≥ 1% but <10%
3	≥ 11% and <33%
4	≥34% and <66%
5	≥67% and 100%

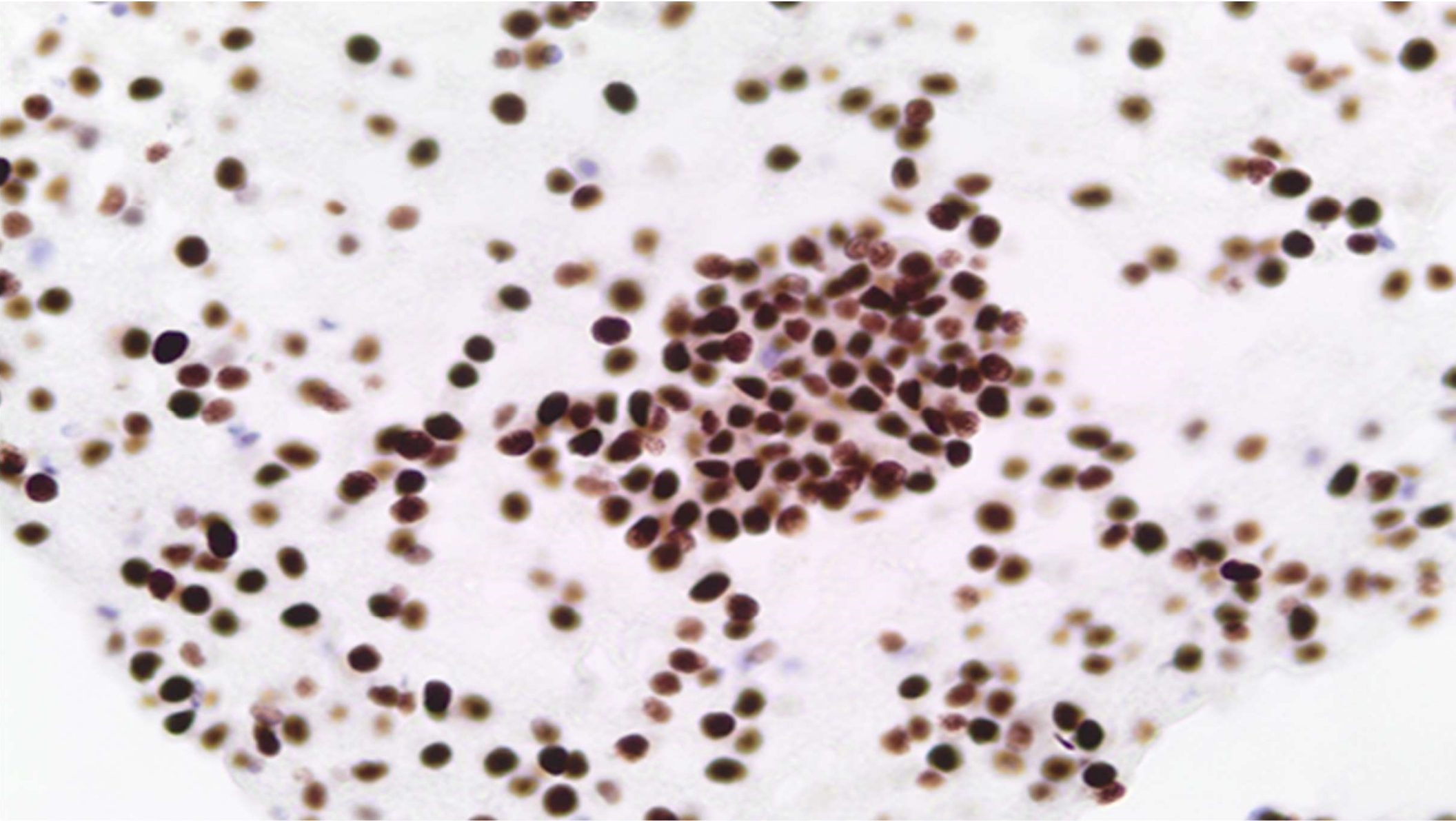
ER & PR Intensity

Score	Intensity
0	No staining
1	Weak staining
2	Moderate staining
3	Strong staining

Results: ER & PR

	ER	PR
Sensitivity	91% (n = 103)	85% (n = 88)
Specificity	62% (n = 29)	84% (n = 44)





HER2 scoring system

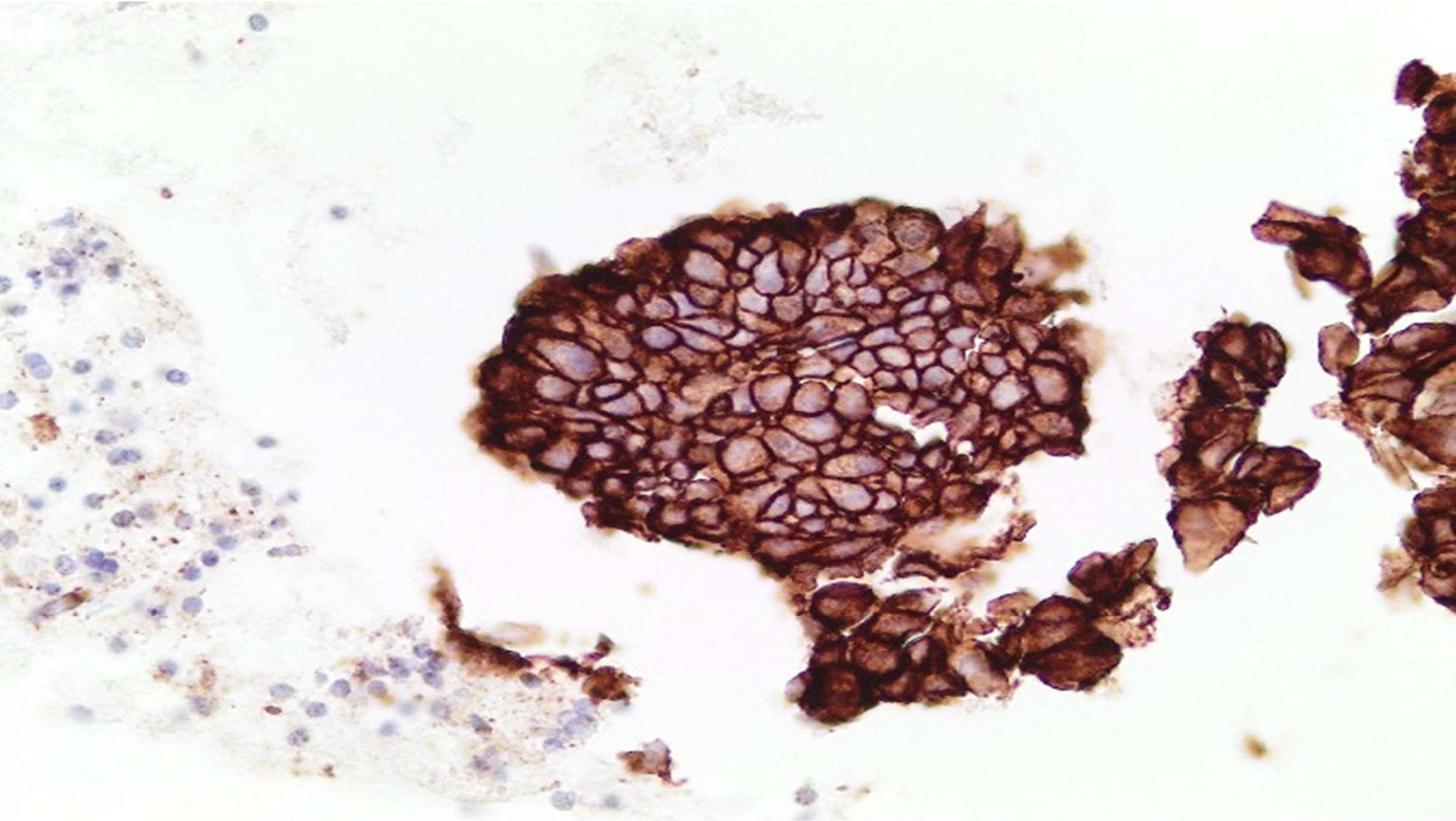
Score	Staining pattern	HER2 Status
0	No staining/ weak membrane staining in <10% of tumour cells	Negative
1+	Weak / partial membrane staining in >10% of tumour cells	Negative
2+	Moderate membrane staining in >10% of tumour cells or strong circumferential membrane staining in <30% of tumour cells	Indeterminate
3+	Strong circumferential membrane staining in >10% of tumour cells.	Positive

HER2 analysis

- Overall agreement of **88%**

FISH

- 25 cases (random selection of negative, 1+, 2+ and 3+ cases)
- 80% of the cell block cases tested with FISH were correctly assessed on the HER2 immunostaining
- These numbers are too small to yield meaningful statistical evaluation
- Further studies are needed



Cytology Grading

Criteria	Score		
	1	2	3
Cell dissociation	Mostly clusters	Mixture of single cells and cells in clusters	Mostly single cell
Cell size	1 - 2 x RBC size	3 - 4 x RBC size	>5 x RBC size
Cell uniformity	Monomorphic	Mildly pleomorphic	Pleomorphic
Nucleoli	Indistinct	Noticeable	Prominent or pleomorphic
Nuclear margin	Smooth	Folds	Buds/ clefts
Chromatin	Vesicular	Granular	Clumped and cleared

Grading analysis

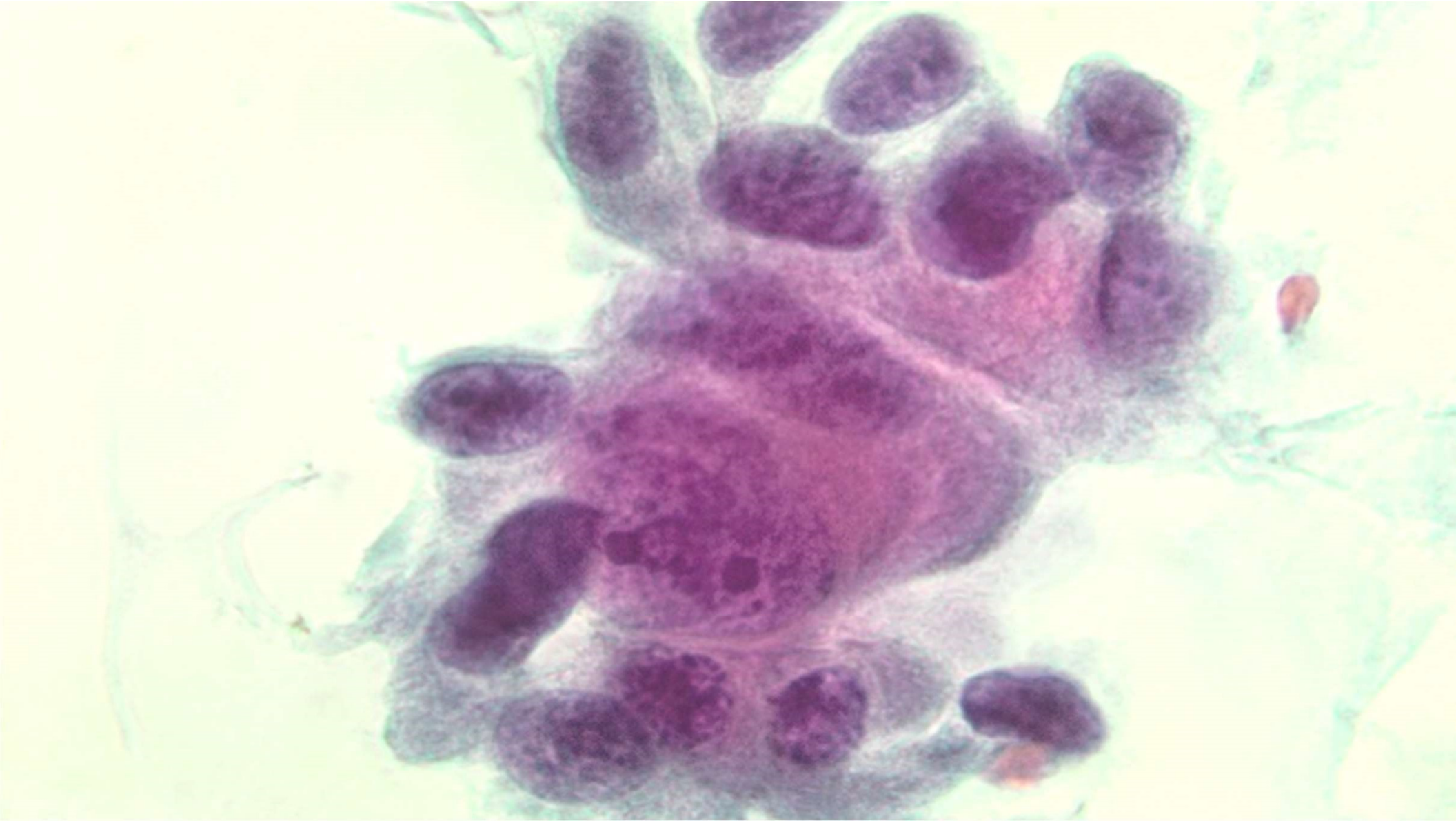
- Overall agreement **41.4%**
- Cytology grading did not correlate well with histology grading

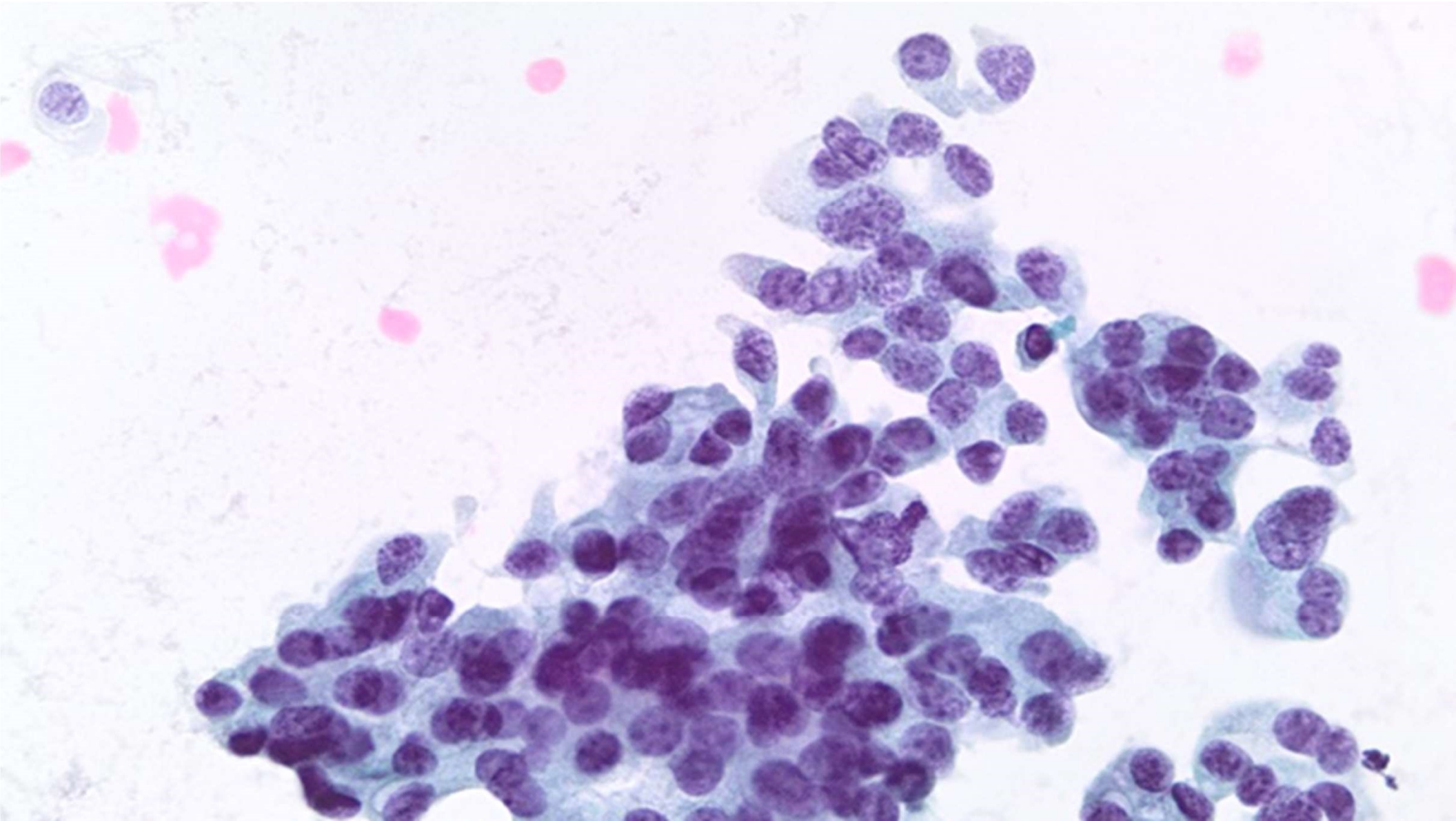
Potential source of error:

- Inconsistency during interpretation of measuring variables
- Variables are exceptionally subjective
- Inter- observer variation occur due to eye resolution limitations

Cytology grading

- Further studies are needed to simplify grading systems
- Standardization that can be consistently applied are essential and need to be established on cytology FNA and cell block material





Conclusion

- Appropriate tissue triaging is of vital importance
- To avoid unnecessary sampling and procedures
- FNAB is safe, reliable and minimally invasive
- The BD Cytorich™ Red cell block collection method produced highly cellular cell blocks with excellent results for ER, PR and HER2 immunostaining

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