

Impact of blood sample handling during ^{99m}Tc-CERETEC leukocyte labeling on image quality and interpretation

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INTRODUCTION

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In vitro leukocyte labeling with ^{99m}Tc-HMPAO is a hematology test performed and optimized in the specialized radiopharmacies of certain university hospitals. In the presence of pain, it enables differential diagnosis between infection on implanted equipment and inflammation. We believe that it requires high-quality biological material. Numerous factors come into play to ensure that the examination runs smoothly, some of them related to the patient, others to those involved. The aim of our study is to highlight the link between sampling quality and the quality of the images observed, in order to optimize our practices and patient care.

OBJECTIVE :
Demonstrate the link between sampling quality and image quality, in order to optimize our practices and patient care.

MATERIALS AND METHODS

1 Definition of blood sample quality assessment criteria and associated scores

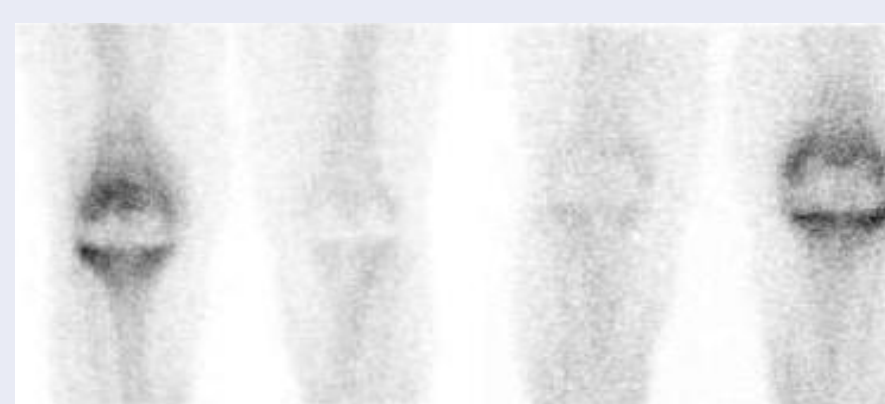
Sampling time (mins) (counted from the moment the first ml of blood reaches the syringe)	Score
< 5 mins	0
> 5 mins	2
> 10 mins	4
> 20 mins	6
Equipment used	Score
19G epicranial needle	0
Pink catheter	2
Midline	4
Haemolyzed blood ?	Score
Yes	4
No	0
Puncture site	Score
Elbow bend	0
Wrist	2
Hand/Foot	4

2 Setting up a rating scale for the various criteria used to assess sample quality

Quotation	Score
Excellent	≤ 2
Medium	3 ≤ score ≤ 5
Bad	≥ 6

3 Definition and rating of image quality criteria

Ratio spleen/liver	Score
bad	≥ 150%
medium	130% ≤ R/F < 150%
good	<130%



4 Statistical comparison of the two groups: Excellent VS average/bad samples

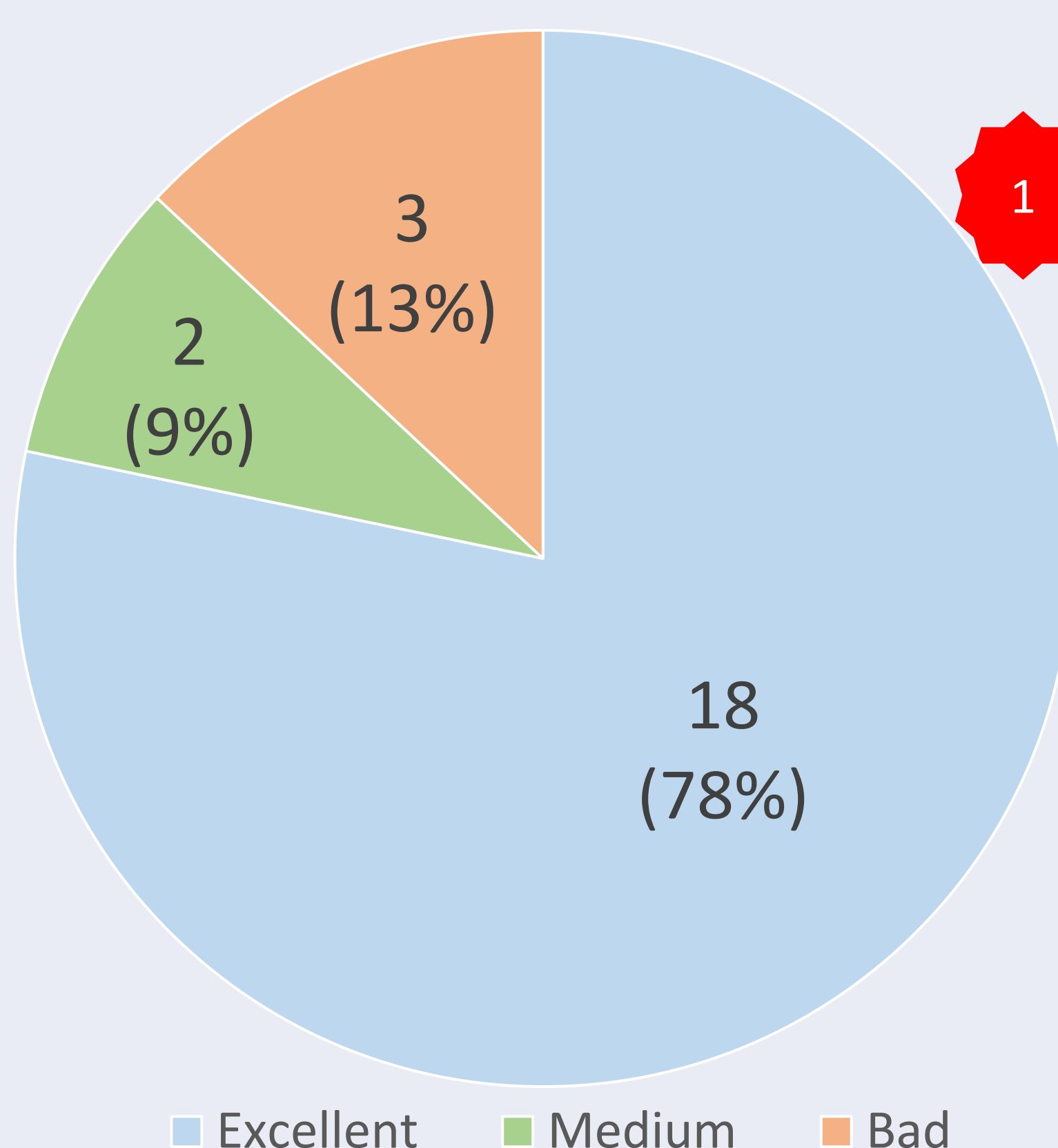
Statistical comparison:
 Mann Whitney test /
 Student test

Ratios
 Spleen/Liver

Marking yields

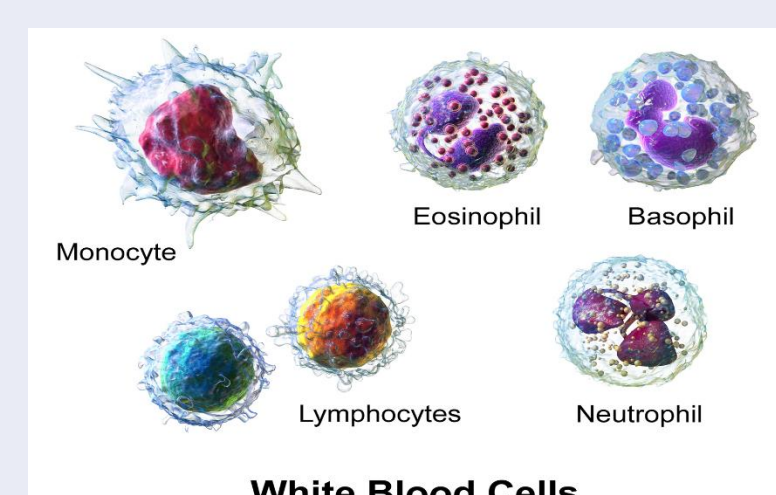
RESULTS

Number and rating of blood samples taken: 23 in all

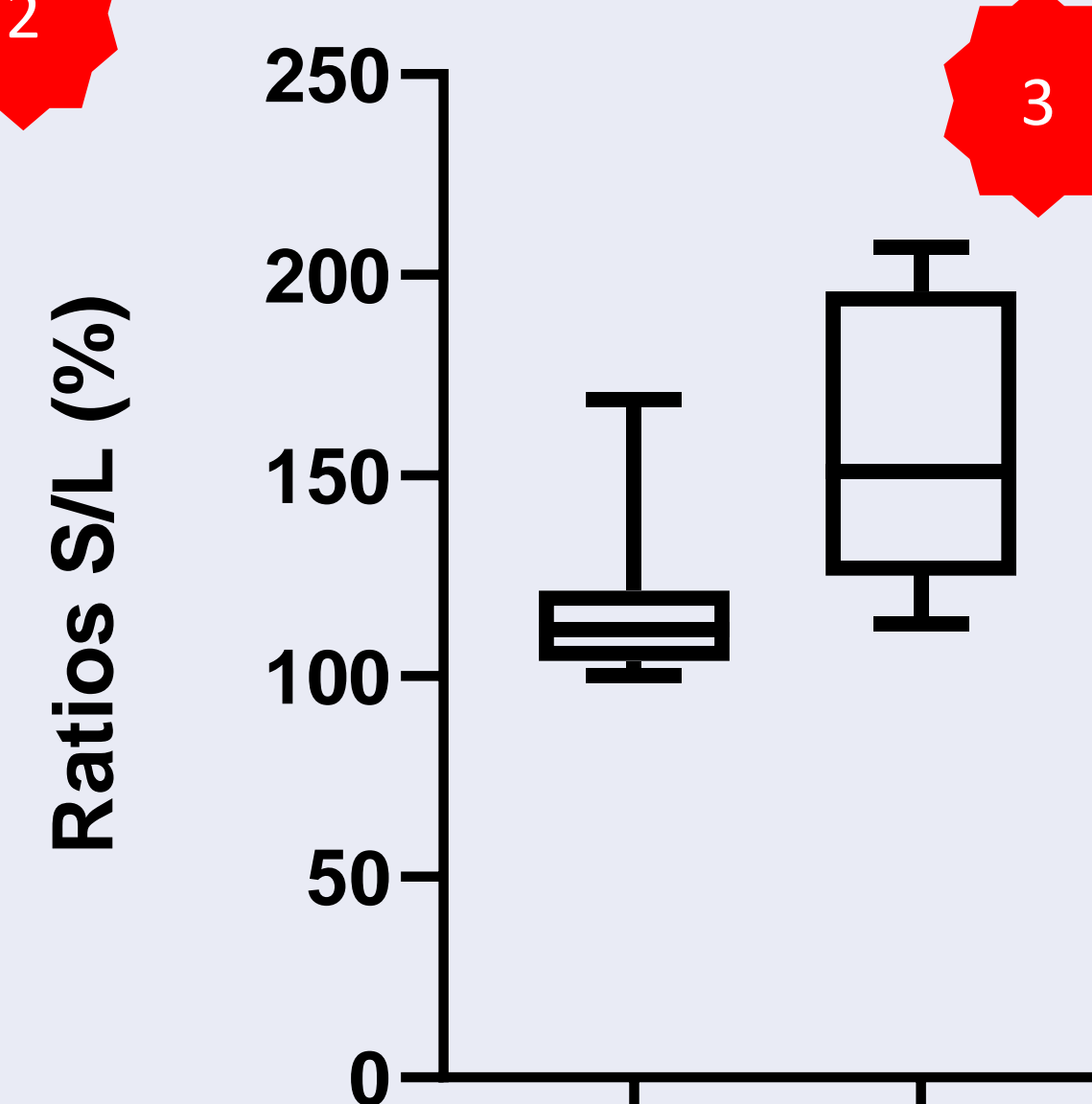


Quality of images corresponding to blood samples

Sampling quality	Matching image quality			Total
	Good	Medium	Bad	
Excellent	17	0	1	18
Medium/Bad	1	1	3	5
Total	18	1	4	23

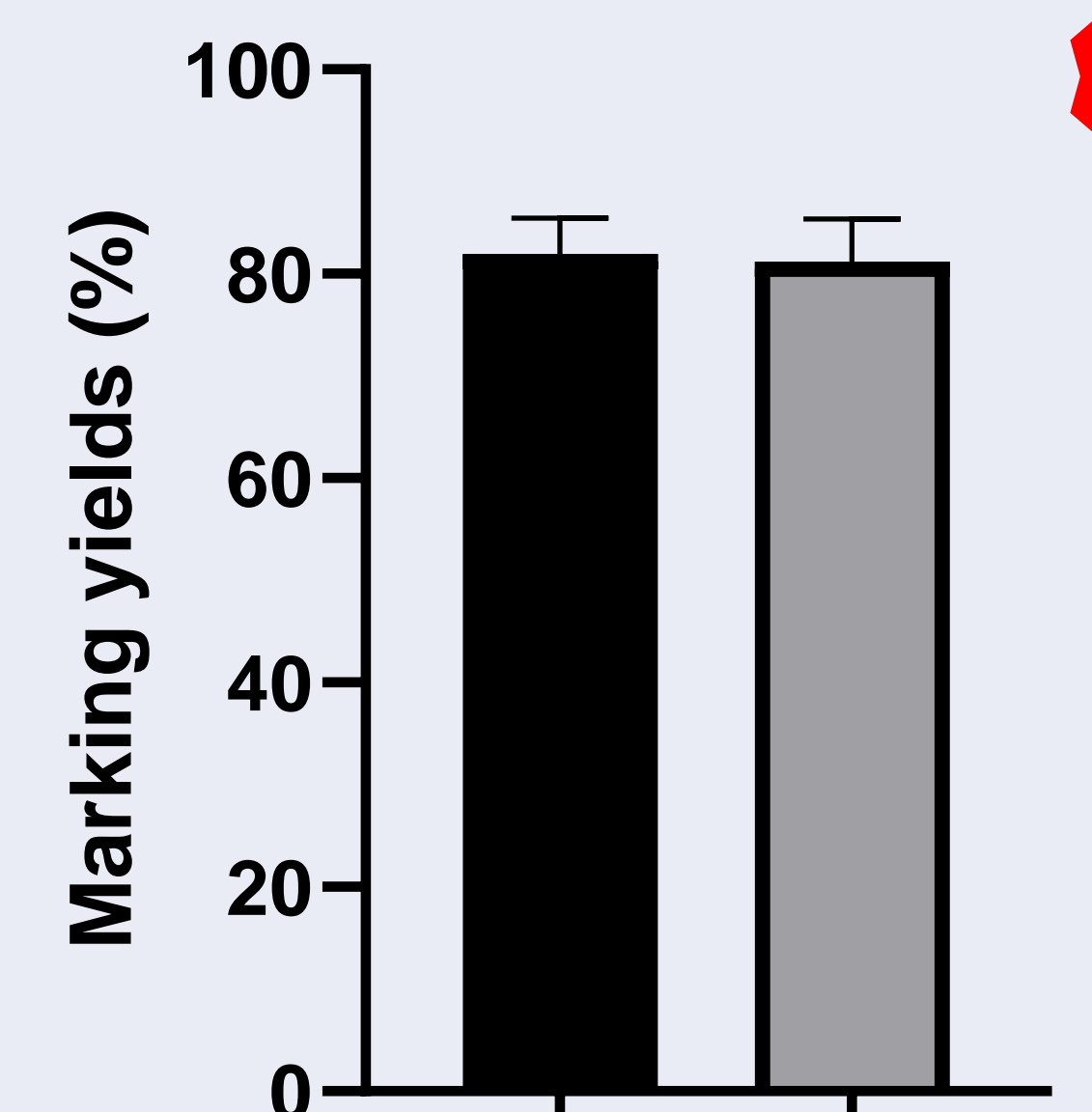


Comparison of S/L ratios of excellent VS average/bad samples : Mann Whitney test (P<0.05)



Excellent VS medium/poor samples (p value = 0.0067)

Comparison of marking yields for excellent VS average/bad sampling groups : Student's t test (P<0.05)



Excellent VS average/poor samples (p value = 0.6960)

CONCLUSION

Our results point to an impact of sampling quality on the quality of the images observed. Several biases should be highlighted, such as the small size of our sample, the low proportion of "poor/average" samples (5/23), the fact that the location of the infection was not taken into account, and our various quality criteria used to produce our associated score, which can be refined to correct the relative importance of each. A longer-term study to broaden the patient pool seems warranted, the idea being to ultimately arrive at optimal sampling recommendations.

