



## ORIGINAL ARTICLE

# Diagnostic usefulness of the cytological study of the transport buffer in transrectal prostate core biopsies<sup>☆</sup>



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### KEYWORDS

Cytology;  
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Prostate  
adenocarcinoma;  
Sensitivity;  
Specificity

### Abstract

**Background:** To evaluate the diagnostic usefulness of the cytological study of the transport buffer in the diagnosis of prostate adenocarcinoma in transrectal core biopsies.

**Methods:** A total of 256 consecutively biopsied patients have been included in the analysis, 100 of them diagnosed of prostate adenocarcinoma. The procedure included the cytological analysis of the transport buffer and conventional histology. Cytological evaluation was performed in a blind way by the same pathologist.

**Results:** Overall sensitivity, specificity, and positive and negative predictive values to detect malignancy in the cytological slides were 54%, 98%, 94% and 76%, respectively. When restricting the analysis to cases with Gleason score higher than 8, sensitivity and negative predictive value increased to 85% and 97%, respectively. Similarly, when the analysis focused exclusively to cases with more than 5 mm of cancer in the biopsy, sensitivity and positive predictive value increased to 66% and 96%, respectively.

**Conclusions:** This study shows that whilst specificity was maintained in 98%, sensitivity, and positive and negative predictive values significantly improved in high grade and high volume adenocarcinomas. Our findings confirm that the cytological study of the transport buffer may complement the histology in the diagnosis of prostate adenocarcinoma.

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**PALABRAS CLAVE**

Citología;  
 Histología;  
 Biopsia del núcleo;  
 Adenocarcinoma de próstata;  
 Sensibilidad;  
 Especificidad

## Utilidad diagnóstica del estudio citológico del tampón de transporte en biopsias por punción prostática transrectal

**Resumen**

**Antecedentes:** Evaluar la utilidad diagnóstica del estudio citológico del tampón de transporte en el diagnóstico de adenocarcinoma de próstata en biopsias por punción transrectal.

**Métodos:** Un total de 256 pacientes biopsiados consecutivamente se han incluido en el análisis, 100 de ellos diagnosticados de adenocarcinoma de próstata. El procedimiento incluyó el análisis citológico del tampón de transporte y la histología convencional. Se realizó evaluación citológica de una manera ciega por el mismo patólogo.

**Resultados:** La sensibilidad, especificidad y valores predictivos positivos y negativos globales para la detección de malignidad en los portaobjetos citológicos fueron 54, 98, 94 y 76%, respectivamente. Cuando se restringió el análisis a los casos con una puntuación de Gleason superior a 8 la sensibilidad y el valor predictivo negativo aumentaron a 85 y 97%, respectivamente. Del mismo modo, cuando el análisis se centró exclusivamente en los casos con más de 5 mm de cáncer en la biopsia la sensibilidad y el valor predictivo positivo aumentaron a 66 y 96%, respectivamente.

**Conclusiones:** Este estudio muestra que mientras que la especificidad se mantuvo en el 98% la sensibilidad y los valores predictivos positivos y negativos mejoraron significativamente en los adenocarcinomas de alto grado y de alto volumen. Nuestros hallazgos confirman que el estudio citológico del tampón de transporte puede complementar la histología en el diagnóstico de adenocarcinoma de próstata.

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**Introduction**

Prostate adenocarcinoma (PAC) is the most common malignancy among the male population in western countries<sup>1</sup> and its diagnosis and management remain a problem of major concern for urologists and health authorities.<sup>2</sup> This has led in the last two decades to the implementation of strategies for the early detection of this malignancy which lead to the discovery of an increasing number of low-grade, low-volume cases which are potentially curable.<sup>3</sup>

Although fine-needle aspiration cytology (FNAC) was the initial diagnostic approach, and it is still used at some institutions,<sup>4-7</sup> transrectal needle biopsy (NB) has gained general acceptance all over the world and is the method of choice for PAC detection in patients with a suspicious digital examination and/or high PSA levels (cut, 4.0 ng/ml).

This study aims at defining the diagnostic efficacy of the cytological analysis of the transport buffer of prostate needle biopsies in a consecutive series of non-selected patients with clinical suspicion of PAC. This diagnostic approach has not been used before in the case of this prostate disease, but it has shown satisfactory results in previous studies carried out on various systems and organs, such as the musculoskeletal system,<sup>8</sup> the kidney,<sup>9</sup> the spleen,<sup>10</sup> the lymph nodes<sup>11</sup> and the thyroid gland,<sup>12</sup> among others.

**Patients and methods**

The NBs of 256 patients with a clinical suspicion of PAC were submitted from the urologist's office to the pathology laboratory at our institution immersed in a cell-washing solution and in a transport buffer (ThinPrep® Cytolyt® Solution, Hologic Inc., Marlborough, MA, USA). Cases were not

clinically selected and were consecutively included in the series in a prospective manner from December 2012 to April 2013. The series was closed when PAC reached 100 cases. Age, serum PSA at the time of biopsy, rectal digital examination, number of punctures, prior biopsy, prostate volume, and transrectal ultrasound findings were the data collected in each case. This study complies with the principles of the Declaration of Helsinki.

The right prostate punctures of the right and left sides were presented together in two different flasks and were routinely processed within the first 3 h after surgery. Two cytological examples were obtained from each sample using successive cyto-centrifugations, one of which was Papanicolaou-stained and the other one remained unstained for possible techniques. At the same time, NBs were fixed with formalin and then embedded in paraffin according to routine laboratory methods. Four consecutive stages of histological sections stained with hematoxylin and eosin in all cases were analyzed. Immunohistochemistry for cytokeratin 34βE12 (Dako, prediluted) and α-methylacyl-CoA racemase (AMACR)/p63 cocktail (BioCare Medical, prediluted) was performed in selected cases, either on unstained cytological slides or in histological cuts as needed in an automated immunostainer (EnVision FLEX, Dako Autostainer Plus).

The cytological and histological specimens were blindly analyzed by the same pathologist (JIL) in all cases. Only two diagnostic categories were considered in the cytological samples: malignant vs. non-malignant. Table 1 summarizes the cytological differential diagnosis of cells found in the cytological specimens. Suspicious cases were assigned to the non-malignant category. The diagnosis of PAC included the Gleason score (GS)<sup>13</sup> involved and the amount of tumor known as total millimeters of cancer (TM).<sup>14</sup>

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