REPRODUCTIVE BIOLOGY

ORIGINAL RESEARCH

Value of quantitative ultramorphological sperm analysis in infertile men

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SUMMARY

A specific cause of infertility cannot be identified in at least 25% of men referred to a specialized clinic. Diagnosis of infertile men is based mainly on standard semen analysis and the observation of sperm under light microscope. The aim of our study was to find the subcellular sperm characteristics that could explain infertility in a group of teratozoospermic infertile men. Morphological characteristics of sperm from non–teratozoospermic (control donors) and teratozoospermic infertile men were analyzed by transmission electron microscopy (TEM) and quantified. Our analysis showed that sperm cells from control donors presented a higher number of normal heads and tails

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than infertile men. Regarding subcellular characteristics of nucleus and tails, only the percentage of vacuolated nucleus, the absence of at least one pair of microtubules of the axoneme and the total distortion of the tail were statistically higher in infertile men than in control donors. There were no differences in the number of normal acrosomes between the groups. Although the ultrastructural sperm defects overlapped between control donors and infertile men, TEM permits the identification and differentiation of a larger amount of defects than light microscopy. Vacuolated nucleus and gross alterations of the tail are the major sperm defects that seem to have prognostic value in teratozoospermic men. *Reproductive Biology, 2010* ***10*** *2: 125-139.*
Key words: electron microscopy, teratozoospermia, sperm alterations, male infertility, quantification

INTRODUCTION

Between 25 to 50% of men referred to a specialized clinic for the evaluation of fertility have idiopathic infertility meaning that a specific cause for their affection cannot be identified [10, 21]. The imprecision of this diagnosis has spurred the development of numerous semen analysis tests looking for a diagnosis and causes of male infertility [10]. Of all the semen parameters, sperm morphology has consistently been the best indicator of male fertility *in vivo* and *in vitro.* Many authors have gone as far as to argue that sperm morphology is a reflection of sperm functional competence [23, 25].

Transmission electron microscopy (TEM) has been advocated as a tool for assessing the structural integrity and the potential effectiveness of sperm [36]. Several studies have found marked ultrastructural differences between the sperm of fertile and infertile subjects including changes in the ultrastructure of the acrosome disparities, in the level of chromatin stability [30] and a consistent reduction in the number and arrangement of axonemal components [19]. When a particular sperm defect predominates in the semen sample such as round-headed [28], large head [16], double heads [20], short tail or dysplasia of the fibrous sheath [4, 11, 12, 13, 14] and abnormal middle piece [29] family associations are usually established and candidate