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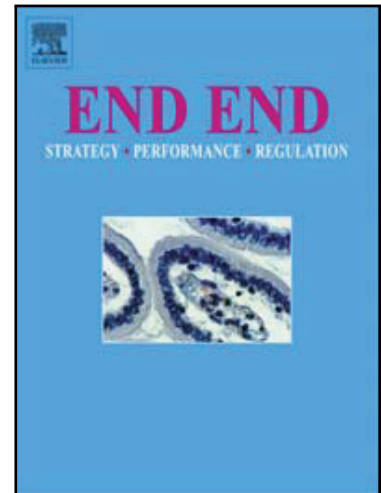
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Short title: Sperm DNA fragmentation for male infertility

Sperm DNA fragmentation index as a promising predictive tool for male infertility diagnosis and treatment management – meta-analyses

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Key message

The assessment of sperm DNA fragmentation (sDF) is a promising tool to be used in clinical and research practice for both the diagnosis and the management of male infertility.

Abstract

Conventional semen analyses have limitations in male infertility diagnosis and prognosis. Assessment of sperm DNA fragmentation (sDF) has been proposed to discriminate fertile from infertile men and predict FSH treatment response in infertile men, although a comprehensive evaluation of this is not available. The aims of these meta-analyses were to assess the power of sDF in male infertility diagnosis and its role in predicting FSH therapy response in infertile men. Two literature searches were conducted in MEDLINE (PubMed), Embase, the Cochrane Library, Scopus and UpToDate. First, interventional/observational clinical trials comparing fertile to infertile/subfertile men were included. Second, interventional/observational clinical trials evaluating FSH-treated infertile men were assessed. sDF levels were significantly higher in infertile men considering 28 studies ($P < 0.001$), independently of the sDF method applied. Receiver operator characteristics curves identified an sDF threshold of 20%, with sensitivity of 79% and specificity of 86%. Six studies showed significant sDF improvement of 4.24% (95% confidence interval: 0.24–8.25%) after 3 months of FSH treatment. These meta-analyses demonstrate the sDF relevance in male infertility, suggesting a higher accuracy in detecting sperm function than conventional semen parameters. Although larger prospective trials are needed, sDF represents a promising tool for clinical and research practice.

Keywords: FSH, male infertility, sperm DNA

Introduction

Male infertility diagnosis includes the evaluation of conventional semen analysis, which is guided by the World Health Organization (WHO) criteria (WHO, 2010). However, an increasing number of studies have highlighted many difficulties and challenges inherent to this methodology. First, the quality of laboratories performing semen analyses is variable, with a generally poor adherence to the WHO guidelines and a limited reliance on quality control protocols (Bjorndahl *et al.*, 2016; Filimberti *et al.*, 2013; Punjabi *et al.*, 2016). This lack of adherence to standardized methods significantly reduces the potential diagnostic power of this tool (Carrell and De Jonge, 2016). Second, conventional semen analysis applied to clinical practice does not evaluate all possible sperm quality parameters, impairing its diagnostic competence.

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