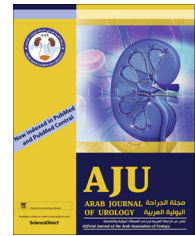




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Advances in sperm retrieval techniques in azoospermic men: A systematic review

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KEYWORDS

Non-obstructive azoospermia;
Operative sperm retrieval;
Testicular failure;
Testicular sperm extraction

ABBREVIATIONS

AZF(a)(b)(c), azoospermia factor (a) (b) (c);

Abstract Objective: To evaluate various methods of operative sperm retrieval in men with non-obstructive azoospermia (NOA) and to determine the optimal surgical approach in terms of effectiveness, morbidity, and complications.

Materials and methods: PubMed and Cochrane databases were searched to identify five recent reviews and meta-analyses evaluating outcomes for sperm retrieval in men with NOA.

Results and Conclusion: Micro-TESE is the most efficient method for retrieving sperm but requires special expertise and can be traumatic for the testes. Conventional biopsies are twice more likely to retrieve sperm than fine-needle aspiration. Testicular aspiration performed by multiple passes into the testis is traumatic and is not efficient for sperm retrieval. Needle-aspiration biopsy and open real-time testicular mapping by the single seminiferous tubule technique can offer less traumatic methods for sperm retrieval, which can be tried before proceeding to micro-TESE. The first attempt at sperm retrieval is the best chance the patient has and should combine

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(O)FNA, (open) fine-needle aspiration;
 ICSI, intracytoplasmic sperm injection;
 IVF, *in vitro* fertilisation;
 MeSH, medical subject heading;
 NAB, needle aspiration biopsy;;
 (N)OA, (non-) obstructive azoospermia;
 PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analysis;
 SRR, sperm retrieval rate;
 SSSSR, single-session staged sperm retrieval;
 SST, single seminiferous tubule;
 TESA, testicular sperm aspiration;
 (c) (micro-) (n) TESE, (conventional) (microdissection) (needle) testicular sperm extraction

various techniques sequentially to give the highest chance of success with the least morbidity.

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Introduction

The advent of intracytoplasmic sperm injection (ICSI) has revolutionised the management of male infertility and made it possible for even an azoospermic man to father a child using sperm retrieved from his epididymis or testis. Operative sperm retrieval has become a routine procedure in all *in vitro* fertilisation (IVF) clinics. However, even though a variety of techniques have been described, there is confusion about which method of retrieval is best suited for a given patient, and most clinics tend to apply the same technique to all patients, which may not be in the best interest of a specific patient.

Operative sperm retrieval is indicated in men with obstructive azoospermia (OA) if reconstruction is not possible, or has failed. In men with OA, sperm may be retrieved percutaneously by percutaneous epididymal aspiration (PESA) [1] or by open surgical procedures, e.g. microsurgical epididymal sperm aspiration (MESA) [2], or the simpler procedure of open fine-needle aspiration (OFNA) that does not need an operating microscope [3], or by a single open testicular biopsy. In any case, sperm retrieval is easy and assured.

The greater challenge is sperm retrieval in men with non-OA (NOA): only some of these men will have a few sperm in the testes, and the distribution of these scanty sperm may be multi-focal or very localised, necessitating different sperm-retrieval techniques.

The purpose of the present review is to critically evaluate the findings and conclusions of recent reviews and meta-analyses on operative sperm retrieval in NOA, so as to develop a customised approach that would enable the clinician to choose from the range of techniques described and offer his patient the best chance of sperm retrieval with the least morbidity and complications.

Materials and methods

A comprehensive search was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines using the PubMed and Cochrane databases from 2011 to 2017. The following keywords were used: ‘testicular sperm extraction’, ‘azoospermia’, ‘sperm retrieval’, and the medical subject heading (MeSH) phrases ‘azoospermia[MeSH]’ AND ‘sperm retrieval[MeSH]’ were included.

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