

# Impact of intracytoplasmic morphologically selected sperm injection (IMSI) on blastocyst quality: a prospective blinded randomized sibling oocyte study of IMSI vs. intracytoplasmic sperm injection (ICSI)

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Sperm seen with IMSI microscope x 6000



Sperm seen with ICSI microscope x 400

## Study question

To evaluate the impact of IMSI on blastocyst development in male factor infertility patients with at least two previous failed ICSI cycles.

## Summary answer

No difference in number of good quality blastocysts on day 5/6 was found between IMSI and ICSI.

## What is known already?

Motile sperm organelle morphology examination (MSOME) at magnification up to 6600x enables assessment of sperm nuclear morphology. Spermatozoa with as few vacuoles as possible can then be selected for microinjection (IMSI). However, a decade after its introduction the clinical implication of MSOME is unclear (1).

## Study design

The study was a prospective oocyte sibling study performed at 3 IVF centers. The randomization to treatment was blinded to the patients, the person performing the embryo scoring and the physician in charge. When 8 or more oocytes were retrieved the oocytes were individually and randomly 1:1 allocated to either ICSI or IMSI.

## Participants/materials

Infertile couples for ART treatment with severe male infertility (sperm concentration < 1 million sperm/ml and/or sperm motility grade less than 2.5 after gradient centrifugation), previously at least two failed ICSI attempts and at least 8 retrieved oocytes were selected for the study. All couples gave their signed informed consent.

## Main results and the role of chance

A total of 58 patients were enrolled in the study with a total of 644 oocytes randomized to ICSI or IMSI (Table I). No statistical difference was found between the treatments in day 5/6 good quality embryos (GQE) per injected oocyte or fertilized oocyte: the percent of good quality blastocysts was 19.6% and 21.1% in the IMSI and ICSI groups, respectively (p=0.71). The fertilization rate was significantly lower in the IMSI group compared to the ICSI group (p=0.004).

Ref: 1. Setti et al. Twelve years of MSOME and IMSI: a review. *Reprod Biomed Online*. 2013 Oct;27(4):338-52.

## Limitations, reasons for caution

The IMSI procedure is a time consuming procedure. Time for selecting an optimal sperm could affect the quality of the embryos, which might explain the impaired fertilization rate in the IMSI group. Furthermore, many men enrolled in the study suffered from severe oligozoospermia and the IMSI technique cannot guarantee that spermatozoa with normal morphology were selected for microinjection.

## Wider implications of the findings

In literature, IMSI is not considered “state of the art” for treating male infertility. The current study included couples with male infertility and at least two previous failed ICSI cycles, which is only one of several potential indications for IMSI. Further studies are needed to elucidate the role of IMSI.

## Study funding/competing interest(s)

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Table I.

Variable	IMSI (n=58)	ICSI (N=58)	Differences between ICSI and IMSI	P-value
Fertilization rate (%)	54.0 (23.7) 56.3 (0; 100) n=58	65.3 (28.5) 68.3 (0; 100) n=58	11.3 (30.2) 11.5 (-75; 80) n=58	0.0040
% GQE D5-6/2PN	19.6 (27.7) 0 (0; 100) n=56	21.1 (28.2) 11.1 (0; 100) n=55	1.26 (29.42) 0 (-100; 67) n=53	0.71
% GQE D5-6/all oocytes	10.2 (13.7) 0.0 (0; 60) n=58	13.5 (19.0) 0.0 (0; 100) n=58	3.30 (18.6) 0.0 (-33; 66) n=58	0.28

For continuous variables Mean (SD) / Median (Min; Max) is presented. Wilcoxon Signed Rank test was used for paired comparison between ICSI and IMSI.