



TARGETED APPROACH TO TESTICULAR PARENCHYMAL BIOPSY SAMPLING

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ABSTRACT

According to the World Health Organization, infertility affects 17.5% of the adult population, while male infertility accounts for 20%. The prevalence of male infertility has increased considerably in recent years. According to the European Association of Urology (EAU) and the American Society for Reproductive Medicine (ASRM), the male factor is involved in 50–60% of infertility cases. Azoospermia is currently considered one of the most difficult forms of male infertility to treat. At the same time, assessment of preserved spermatogenesis within testicular tissue remains challenging and controversial.

Background: According to the World Health Organization, infertility affects 17.5% of the adult population, while male infertility accounts for 20%. The prevalence of male infertility has increased considerably in recent years. According to the European Association of Urology (EAU) and the American Society for Reproductive Medicine (ASRM), the male factor is involved in 50–60% of infertility cases. Azoospermia is currently considered one of the most difficult forms of male infertility to treat. At the same time, assessment of preserved spermatogenesis within testicular tissue remains challenging and controversial.

Numerous unresolved issues remain in andrology and reproductive medicine. Accurate sampling of testicular parenchymal biopsy specimens is essential for assessing spermatogenesis, determining treatment strategy, and identifying potential solutions to infertility. Therefore, targeted Micro-TESE with biopsy sampling from tissue located both adjacent to and distant from the epididymis may improve clinical outcomes.

Objective: To evaluate the effectiveness of a targeted approach to testicular tissue biopsy sampling. The study included men who presented with infertility and had azoospermia confirmed by semen analysis; all underwent minimally invasive Micro-TESE. Microscopy was used to assess the characteristics of the testicular coverings, the presumed morphofunctional state of the testicular parenchyma, and the degree of seminiferous tubule prominence on tissue sections. During biopsy sampling, based on intraoperative visual assessment, biomaterial was obtained not from a single visually prominent area of the parenchyma but from several distinct zones with clearly visible tubules, as well as from areas retaining their characteristic color. The specimens were submitted separately for histomorphological examination. In all patients, biomaterial from the primary “A” site was separated, while additional samples from the “B” and “C” sites were also collected and referred for histological examination.

Materials and Methods: The study was based on the Micro-TESE procedure. Twenty patients aged 22–30 years with confirmed azoospermia were included in the analysis. Testicular tissue was used as the study material. Histological examination was performed at the high-technology IPSUM Pathology Laboratory.

Results: The findings showed that, with the targeted approach, the clinical and morphological characteristics of separately collected biomaterial samples from the same patient differed in most cases. Histological examination of biopsy specimens obtained from multiple sites provided more comprehensive diagnostic information. These findings played an important role in determining the treatment strategy.

Conclusion: Obtaining biopsy specimens from several diagnostically significant sites during Micro-TESE improves the diagnostic effectiveness of azoospermia assessment. This approach reduces discrepancies between intraoperative embryological microscopy findings and histomorphological conclusions and serves as an important factor in determining treatment strategy. Diagnostic criteria for male infertility conditions requiring surgical intervention remain a pressing issue in andrology.

