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Birth plate - Masaccio, 1449

Theme:

The impact of new technologies  
on the quality of infertility treatment

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Some simplified and optimized procedures are already available and other are at the experimental level. The final goal is to realize a treatment cycle at an acceptable cost, effective and safe for operators, patients and embryos.

## L12

### **Evidence-based approach to infertility diagnosis**

Tatjana Motrenko Simic

The main goal in infertility diagnosis is to identify basic diagnostic testing for infertile couples that can give prompt diagnosis and allow patients to start with proper therapeutic treatment. A simplified approach will lead to significant reduction in time and cost of infertility investigating.

The first step is proper medical, lifestyle and social history and physical examination. Basic evaluation - group of tests proven to be connected with pregnancy rate:

- semen analysis ( male factor )
- mid luteal progesterone level ( ovulation function)
- Hysterosalpingography – HSG ( uterine morphology and tubal patency)

Semen analysis should be performed twice in time interval of at least one month, properly taken and without any severe illness in male for last 3 months. If the semen analysis according WHO criteria are below normal value, additional tests should be provided: hormones levels (FSH, LH, testosterone, prolactine), sperm surface antibodies (class IgA and IgG), for azoospermia - $\alpha$  glycosidase and fructose levels, testicular biopsy. For patients proceeding to ICSI procedure, sperm vitality test is with prognostic value.

For ovulatory patients serial ultrasound monitoring can exclude LUF syndrome and day 3 FSH is recommended for age over 30. In anovulatory patients or with irregular cycle additional tests are: TSH and prolactine, ovarian reserve prediction (LH, day 3 inhibin B, CCCT, AMH), hisrutismus (testosterone, DHEA-S, 17-hydroxyprogesterone).

Hysterosalpingography ( HSG) sensitivity is 65% and 83% specificity for tubal obstruction. However, in women with suspected tubal damage, previous pelvic surgery, elevated Chlamydia antibodies and ultrasonography suspected endometriosis, HSG can be avoided and proceed directly to laparoscopy.

As invasive and costly diagnostic technique, even complementary with HSG, laparoscopy should be routinely used as further diagnostic procedure combined with endoscopic surgery. Hysteroscopy as a diagnostic and treatment method is required only in case of uterine pathology.

For some infertility cases according family and clinical history genetic test should be recommend: karyotype (habitual abortion, azospermia), AZF deletion and monogenic conditions.

## L13

### **Male infertility: modern and rational diagnostic approach**

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Male infertility may be caused by pre-testicular, testicular and post-testicular forms. A modern and rational diagnostic approach should take into account the variegate etiology, paying attention to those causes which have recently been brought to light. Among these, the genetic causes of male infertility and the integrity of sperm chromatin and/or DNA have attracted much attention. Genetic causes of male infertility are of particular interest first of all because they are frequent

(15%) particularly in those patients requiring assisted reproductive techniques (ART) to overcome infertility (24%). To avoid a father-to-son transmission of the genetic defect, a careful diagnostic screening is mandatory. Genetic abnormalities may be subdivided in chromosome abnormalities, gene mutations and sperm aneuploidy.

Male accessory gland infections (MAGI) include: prostatitis, prostatic-vesiculitis and prostatic-vesiculo-epididymitis. They contribute to infertility to an extent which depends upon the site and the extension of the infection as well as on the degree of the host inflammatory response (leukocytospermia, production of reactive oxygen species, ROS, and/or cytokines). MAGI cause infertility not only by altering conventional sperm parameters but also by damaging sperm DNA. This may be achieved by direct and indirect effects (over-production of ROS and/or cytokines). A thorough diagnostic approach aimed at establishing the presence of MAGI, the identification of the microbial agent responsible (when possible), the extension of the inflammatory process, and the therapeutic strategy is mandatory to reduce the number of spermatozoa with damaged DNA.

## L14

### **Sperm function – mode of evaluation**

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Sperm dysfunction is the single most common cause of infertility and affects approximately 1:15 men. Studies using semen assessment as the criteria for sub fertility (sperm concentration  $<20 \times 10^6/\text{ml}$ ) show that 1:5 18 year olds are classed as sub-fertile. Thus, male sub-fertility is a very significant global problem and, what is most worrying, is that the recent reports suggesting that its prevalence is increasing.

There is an urgent requirement to develop new and robust tests of sperm function to accurately diagnose male infertility and identify what we would call a good sperm. The value of traditional semen parameters (concentration, motility and morphology) in the diagnosis and prognosis of male infertility has been debated for 60 years. Unquestionably, even with appropriate quality assurance, traditional semen parameters can only provide a limited degree of prognostic and diagnostic information for the infertile couple primarily at the lower ranges of the spectrum. It is therefore necessary to develop simple, robust and effective tests of sperm function. Yet, despite the plethora of potential assays available, results have been very disappointing. Even promising initial data for DNA damage of sperm is now being questioned (Collins *et al.*, 2008 Fertil Steril 89, 823-31).

So where do we go? A priority is to develop new tools. Several approaches are being examined from the use of sophisticated microarrays to simplifications of old testing methods (Harper *et al.*, 2008; J Cell Sci 121, 2130-5). Our approach is to develop new tools is concentrating on the proteome (Barratt 2008, Hum Reprod 23,1240-1). With no physiologically active transcription and translation, spermatozoa are ideal cells to study from a proteomic perspective. As such, proteomics has the potential to transform our understanding of the workings of the mature cell. However, significant challenges remain. We are only at the very beginning of our journey. It's likely to be a rocky journey and a long one as more developed field such as cancer still have poorly developed biomarkers (Sawyers 2008, Nature 452, 547-552). Nevertheless, as long as we are critical in evaluating the potential of these new biomarkers progress will be made and we won't be in the same unenviable position we are currently in.

## L15

### **Male surgery in the era of ICSI**

A Watrelot