

Role of culture sensitivity of semen in infertility cases

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Abstract

Introduction: Infections of male urogenital tracts may contribute to male infertility. However, the effects of bacterial presence on sperm quality and fertility are controversial. **Objectives:** To find out whether bacterial contamination could decrease sperm quality and to find out the effect of antibiotic therapy in cases of leucocytospermia on semen quality. **Methodology:** This is prospective study of 25 couples of infertility who came to us in outdoor clinic during the period of July 2012 to November 2014. **Results:** Significant pus cells (>3 pus cell/HPF) were found in 12 (48%) patients and patients having decrease motility of 5-25 % were having significant pus cells as compared to normal patient. In this group 3 out of 4 patients (75%) having significant pus cells. As the number of pus cells increase, motility decrease. *Staphylococcus aureus* was the highest prevalent bacteria isolated in this study. **Conclusion:** Detailed semen examination should not be concentrated only on sperm count but sperm motility and pus cell should be thoroughly examined. Majority of patients having pus cells in their semen are sensitive to quinolone group of drugs. But ideally we should give appropriate drug according to culture sensitivity report of patients having significant pus cells in their semen. Patients with significant pus cells responded well with antibiotic in form of increase in motility of sperm and increase rate of conception.

Keywords: culture, sensitivity, infertility

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Introduction

Infections of the male genitourinary tract account for up to 15% of cases of male infertility. Acute and chronic infections and consequent inflammation in the male reproductive system may compromise the sperm cell function and the whole spermatogenetic process causing qualitative and quantitative sperm alterations. Recent studies have shown that the simple presence of bacteria in semen samples may compromise the sperm quality. The bacteria responsible for semen contaminations generally originate from the urinary tract of patients or can be transmitted by the partner via sexual intercourse. The most frequently isolated microorganism in male patients with genital tract infections or semen contamination is *Staphylococcus aureus* and *Escherichia coli* [1-5]. The influence of gram-positive uropathogenic bacteria on sperm morphology and function has been poorly investigated until now. It has been reported that aerobic cocci are present in about 50% of semen samples of male partners in infertile couples. *Enterococcus faecalis* was isolated from 53% of patients, micrococci from 20% and alpha-haemolytic streptococci from 16% of the infected samples. Increased prevalence of genital tract infections caused by *E. faecalis* is associated with compromised semen quality in terms of sperm concentration and morphology.

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The presence of micrococci and alpha-haemolytic streptococci does not appear to exert any detrimental effect on sperm quality. Although no significant depressor effect of enterococci on sperm motility was observed, some researchers described, in an *in vitro* study, a negative influence on membrane integrity of human sperm head, neck and mid-piece, probably mediated by hemolysin, a well-known virulence factor of enterococci. Genital ureaplasmas and mycoplasmas may colonize male urethra and contaminate the semen during ejaculation. However, these microorganisms and particularly *Ureaplasma urealyticum* are potentially pathogenic species playing an etiologic role in both genital infections and male infertility. *U. urealyticum*, one of the most frequent causes of the male infertility, due to its ability to reduce semen quality and the fertilizing potential of sperm, negatively influences the sperm motility, density and morphology and reduces the oxidoreductive potential of the ejaculate, which makes sperm more vulnerable to peroxidative damage [6-10]. The cause-effect relationship between bacterial infections and semen contamination and male infertility is still being debated. To complicate the problem even more, the presence of bacteria in semen samples of infertile men has a similar prevalence to that observed in fertile males. Our data suggest that the presence of bacteria in semen samples may influence the sperm quality, mainly by the induction of apoptosis and necrosis, which may in part be responsible for the observed reduction of sperm motility. However, another possible explanation may reside in the putative existence of an antigenic mimicry between some constituents of sperm flagella such as tubulin, one of the major component of axoneme, and bacterial proteins. Molecular mimicry of host structures

with proteins encoded by microorganisms can have pathogenetic consequences; infection may induce antibodies and T cells to react against bacterial cell constituents, which can also recognize self-components and immunomediated damage may follow.

Aims and objectives of study

1. To verify the prevalence of semen bacterial contamination.
2. To find out whether the contamination could decrease sperm quality.
3. To find out effect of antibiotic therapy on leukocytospermia and its effect on semen quality.

Material & method

This is prospective study of 25 couples of infertility who came to us in outdoor clinic during the period of July 2012 to November 2014. Detailed history inclusive of their presenting complaints, type of infertility, age of couple, occupation, education, detailed marital history, relevant family & past history, inclusive of medical, surgical illness if any. Past consultation, urological history, & sexual history were elicited. General physical and local examination of penis, scrotum, testis, vas deference, prostate, seminal vesicle was done. Patients were examined for neurological defects.

First random sample and subsequent two samples at 1 month interval after 2- 3 days of abstinence were collected and semen analysis done.

All those patients whose random semen analysis & consequent two more semen analysis at one monthly interval showed pus cells of >1 to 2, included in the study.

The semen samples were analysed for volume, sperm density, total sperm/ejaculate, sperm motility & morphology as per criteria set in

laboratory manual for examination of human semen & semen-cervical mucus interaction, press concern, Singapore 1980.

All patients with leucospermia were offered 4 week antibiotic therapy according to culture sensitivity. Repeat semen analysis done after 4 weeks of antibiotic therapy[11-13]

Results

Total 25 couples of infertility came to us in outdoor clinic with pus cells in their semen during the period of July 2012 to November 2014. Age of male partner ranged from 20 to 40 years with mean of 28.8 years. And age of female partner ranged from 20 to 35 years with mean of 24.96 years. Thus, we had younger age group of couple presented for their infertility. In our study 80% patients are from urban area. Majority of the patients are from middle and lower middle class. In this series 84% patients presented as primary infertility and 16 % presented as secondary infertility. 36 % had 2 to 3 years of active married life and 32 % had 4 to 5 years of active married life with mean of 4.96 years. The mean semen quantity in present study was 1.8 c.c. 16% patient had sperm density less than 20 million/ml. 10 patients (40%) had motility less than 50%. 3 patients (12%) who had more than 10 pus cells/HPF indicating severe infection. 6 (24%) patients showed no organism in their semen. Staphylococcus aureus (table 2) was the highest prevalent bacteria isolated in this study (32 %). Majority of organisms are sensitive to quinolone group and cephalosporin group of drug (table 3). 4 (16 %) patient conceived after one month antibiotic treatment. Among this group average sperm motility was 26.5% and average 8 or more pus cells/HPF before antibiotic therapy.

Table 1: Relation between pus cells and motility

| Motility in percentage | No of patients | Percentage | Percentage of patient having >3 pus cells/HPF |
|------------------------|----------------|------------|---|
| 5-25 | 4 | 16% | 75% |
| 25.1-50 | 6 | 24% | 50% |
| >50 | 15 | 60% | 40% |

Table 2: Isolated organisms

| Organism | No of patient | Percentage |
|--------------------------------------|---------------|------------|
| No organism | 6 | 24% |
| Staphylococcus aureus | 8 | 32% |
| Pseudomonas aeruginosa | 2 | 8% |
| E. coli | 2 | 8% |
| Streptococci | 1 | 4% |
| U. urealyticum | 2 | 8% |
| Coagulase negative staphylococcus | 2 | 8% |
| Klebsiella | 1 | 4% |
| Gram + cocci and staph saprophyticus | 1 | 4% |

Table 3: Antibiotic sensitivity

| Organism | Antibiotics sensitivity |
|--------------------------------------|--|
| Staphylococcus aureus | Quinolone sensitive ,aminoglycosides |
| Pseudomonas aeruginosa | Cephalosporin and quinolone sensitive, aminoglycosides |
| E. coli | Cephalosporin and quinolone sensitive |
| Streptococci | Cephalosporin sensitive |
| U. urealyticum | Cephalosporin sensitive |
| Coagulase negative staphylococcus | Cephalosporin and quinolone sensitive |
| Klebsiella | Quinolone sensitive |
| Gram + cocci and staph saprophyticus | cephalosporin and quinolone sensitive |

Table 4: Outcome

| Characteristic | No of patient | Percentage |
|-----------------------------------|---------------|------------|
| Significant Increase in motility | 5 | 20% |
| Significant Decrease in pus cells | 8 | 32% |
| Patient conceived | 4 | 16% |
| No significant change | 5 | 20% |

Conclusion

Semen analysis is an important investigation and should be done in each and every male partner of each infertile couple. Normally when patient come to us we concentrate on female partner but male partner should also be thoroughly examined and investigated individually. Detailed semen examination should not be concentrated only on sperm count but sperm motility and pus cell should be thoroughly examined. Majority of patients having pus cells in their semen are sensitive to quinolone group of drugs. But ideally we should give appropriate drug according to culture sensitivity report of patients having significant pus cells in their semen. If facility of culture is not available, patients should be given quinolone group of drug for 1 month. As it has been observed in this study, patients with significant pus cells responded well with antibiotic in form of increase in motility of sperm and increase rate of conception.

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