Research Article

Scrotal sonography in early management of subclinical varicocele and male infertility

Rahul Prajapati, Jigarsingh Jadeja, Mansukh Patel

General Surgery Department, Smt NHL Municipal Medical College, Gujarat University, Ahmedabad, Gujarat, India.
Correspondence to: Rahul Prajapati, E-mail: drhirenparmar@gmail.com

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Abstract

Background: Varicocele is the most common cause of male infertility. About 20–30% men with varicocele are infertile. The clinically obvious varicocele is identifiable and correctable cause of male infertility, but less is known about the subclinical varicocele and its relationship to infertility. However, subclinical varicocele seems to be an important cause of infertility and hence scrotal ultrasonography is increasingly used in the diagnosis of subclinical varicocele. This study was undertaken to reveal incidence of subclinical varicocele in patients with severely impaired fertility potential.

Objectives: To find the prevalence of subclinical varicocele in subjects of severely impaired fertility potential.

Materials and Methods: The semen samples were obtained from 31 male partners (age 25–40 years) of infertile couples (sperm count less than 1 million/ml) attending the OPD Smt. SCL Hospital, Ahmedabad. They were analyzed for routine seminogram parameters. In this study, we evaluated male subjects with severely impaired fertility potential using scrotal ultrasonography, follicle-stimulating hormone, luteinizing hormone, and free testosterone.

Results: The subclinical varicocele was present in 12 of 31 infertile male subjects evaluated. Percentage prevalence of subclinical varicocele was observed to be 39%. Hormonal levels of all the subjects studied were within normal limit. There was no significant difference in testicular volume of affected side and contralateral side of infertile male subjects.

Conclusion: Scrotal ultrasonography is an important technique to reveal the subclinical varicocele for early diagnosis and management of these infertile male subjects.

KEY WORDS: Male infertility, scrotal ultrasonography, subclinical varicocele, varicocele

Introduction

A varicocele is a vascular abnormality of the scrotum that is defined as pathological dilations of venous pampiniform plexus[1,2] resulting from absence or incompetence of the valves of the internal spermatic vein.[3,6] It is currently the most common abnormality identified in male subjects being evaluated for infertility.[1,7,8] The incidence of varicocele in the general population is approximately 15%, whereas 19–41% male subjects presenting for infertility investigation show varicocele.[2,9,10] Studies have shown that subclinical (non-palpable) varicoceles are much more common, being present in 44% fertile men and ~60% men attending infertility clinics.[1,11,12] The history of presence of varicocele can be traced back to first century AC when Greek physician Celsus noted that "The veins are swollen and twisted over the testicle, which becomes smaller than its fellow, in as much as its nutrition has become defective."[13] The first notice that varicocele might be related to infertility was made between the end of the nineteenth and the beginning of the twentieth century when surgical repair of varicocele was shown to improve the quality of sperm.[13] Tulloch in 1952 first reported that bilateral surgical repair of varicocele in a man with azoospermia resulted in an increase in sperm concentration and a spontaneous pregnancy.[13,14]

Varicoceles are normally diagnosed by physical examination through palpation of spermatic cord.[1] The nonpalpable enlargement of the venous plexus of the spermatic tone, which is diagnosed only by imaging techniques, is defined as subclinical varicocele.[8,13] The subclinical varicocele can be detected by radiological imaging studies such as scrotal ultrasonography (USG). Scrotal USG is a noninvasive,

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inexpensive technique and is very sensitive in the diagnosis of subclinical varicocele.[3,15,16] Infertile man without palpable scrotal lesion (subclinical) is generally not referred for sonographic studies.[3] Hence, we undertook this study to find the significance of subclinical varicocele in male infertility.

Materials and Methods

This study was conducted to find out the prevalence of subclinical varicocele in subjects of severely impaired fertility potential. The semen samples were obtained from 31 male subjects (age group of 25–40 years) who were selected from the male partners of the infertile couples (sperm count less than 1 million/mL), who attended our outpatient department. The cases of primary as well as secondary infertility were included in the study, and they were referred by the Department of Obstetrics and Gynecology. The clinical examination of the external genitalia was done at the Surgery Outpatient Department. After explaining the purpose of the study, the procedure that was involved, and the confidentiality of the data, informed written consents were obtained from all the subjects. Subjects were asked to observe 3 days of sex abstinence and their semen samples were collected on the fourth day. The semen samples were collected by masturbation. After complete liquefaction of the semen samples at room temperature, each sample was tested for the physical seminogram parameters. The routine semen analysis was done using a sperm quality analyzer (SQA IIC-P; Medical Electronic System, Israel) for the sperm concentration (millions/mL), the percent sperm motility, and the percent normal sperm morphology according to the WHO guidelines (WHO, 1987). In this study, we evaluated male subjects with severely impaired fertility potential by scrotal USG, follicle-stimulating hormone, luteinizing hormone, and free testosterone.

The statistical analysis of the data was done under the guidance of a statistician. The data were reported as mean ± SD. *p*-Values of less than 0.05 were considered as statistically significant.

Result

Table 1 shows the mean values of right testis volume (in mL) in control group is 16.18 ± 9.46 and that of left testis volume is 15.98 ± 8.74, and in subclinical varicocele group mean value of right testis is 15.29 ± 6.45 with left testis volume as 16.62 ± 7.02. There was no significant difference in testicular volume of affected side and contralateral side of infertile male subjects. Twelve patients were having subclinical varicocele.

Table 1: Testicular volume in control group and subclinical varicocele group

Group	Control group	Subclinical varicocele group
Right testis volume (in mL) (mean ± SD)	16.18 ± 9.46	15.29 ± 6.45
Left testis volume (in mL) (mean ± SD)	15.98 ± 8.74	16.62 ± 7.02

Discussion

In this study, we found that right and left testicular volumes are not significantly different in men with subclinical varicocele. Also testicular volume on affected side was not significantly less than that on contralateral side. Testicular volume of subjects with subclinical varicocele was not significantly different from testicular volume of control subjects. Hence, our study concluded that the prevalence of subclinical varicocele in the infertile males is almost equal to incidence of clinical varicocele in the patients with primary infertility. The prevalence of varicocele in adult male in general population is 15% and that in adult male in primary infertility 30–40%[17] and in secondary infertility 50–80%.[7,18]

Our study does not support the findings of Lipschultz and Corriere[19] and Zini *et al*.,[20] who showed that testicular volume in men with varicocele was significantly decreased compared to controls without varicocele. Varicocele has a detrimental effect on fertility was supported by existence of a relatively higher frequency of men with varicocele among infertile population (25.4%) than men with normal sperm quality (11.7%).[21,22] MacLeod in 1965 described semen parameters abnormality in infertile male with varicocele.[23] Nagao *et al*.[24] also indicated that hormonal abnormalities can be observed in both fertile and infertile men with a varicocele, suggesting some degree of testicular dysfunction in all men with a varicocele. The decrease in plasma testosterone concentrations (hypoandrogenic state) that affects spermatogenesis was found in patients with varicocele.[2,7,25] The pathophysiology of the varicocele effect on fertility remains unclear but it is suggested that it impairs normal testicular functions by elevating scrotal temperature via reflux of warm abdominal blood through incompetent valves of spermatic veins.[1,26,28] The WHO presented similar results in multicentric study that evaluated physical findings and semen characteristics of men presenting for infertility.[29] Various imaging studies used for subclinical varicocele are scrotal USG, venography, thermography, and radionuclide scrotal scanning.[1,3,30,31] The study conducted by Gonda *et al*.[3] showed that sonography was positive for subclinical varicocele in 95% patients, whereas nuclear scanning was considered positive in only 55%. The availability, reproducibility, and noninvasiveness of scrotal USG have led to its increased use in the diagnosis of varicocele. Detection of subclinical varicocele is important for the decision-making process and further investigated by USG. Treatment of cases with subclinical varicocele is controversial. Partial beneficial effect on sperm parameters was shown in infertile patients with subclinical varicocele in randomized controlled study.[32] A

significant increase in sperm density and total motile count was recorded 1 year after operation.[21] Some of the authors have suggested improvement in sperm parameters after varicocelectomy with men having subclinical varicoceles.[33,36] The study conducted by Gonda *et al*.[3] proved that surgery showed improvement in the semen parameters (count and motility) in patients with subclinical varicocele and patients became fertile.

The favorable pregnancy rates were achieved in those patients who were treated, and this emphasizes the importance of making the diagnosis of subclinical patients.[3] Long-term follow-up of these subjects should be carried out to know the progress of this varicocele. Treating such subclinical varicoceles will improve the seminogram parameters, and fertility potential of these subjects needs to be investigated. Lack of standardized criteria for diagnosis and conflicting treatment outcome of subclinical varicocele raise questions about the existence and significance of this entity. The exact impact of subclinical varicocele on impairing infertility cannot be revealed due to small size of population in our study.

Conclusion

Scrotal USG is an important investigation to reveal subclinical varicocele for early diagnosis and management of these infertile male subjects.

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