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AN EVALUATION OF BLOOD SEROTONIN IN INFERTILE MALE PATIENTS

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This study was made to clarify what role serotonin plays in testicular function. Forty-five infertile men were subjected to the study; 30 had oligozoospermia and the others had azoospermia. Blood serotonin levels of the patients were determined and the relationship between blood serotonin levels and other clinical findings was evaluated statistically. The mean value of blood serotonin in oligozoospermia was 80.1±33.0 ng/dl and that of azoospermia was 107.0±41.2 ng/dl, the difference being significant statistically ($p<0.05$). The blood serotonin level of the patients who had varicocele was 83.4 ng/dl and that of those who did not 94.0 ng/dl, there being no statistically significant difference between them. The level in the patients who had obstructive lesions was 80.3 and that in those who did not 92.1 ng/dl, there being no significant difference between them. The blood serotonin level proved to be unrelated with other clinical findings.

Key words: Serotonin, Male infertility

INTRODUCTION

The administration of serotonin has been confirmed to decrease testicular volume by experimental studies in rats. Vasoconstrictive function of serotonin[1] followed by change in the hormonal circumstance, mainly testosterone and related substances[2], have been considered as the mechanism involved. However, a few clinical studies on the role of serotonin in infertile men have been reported. The objective of this study is to clarify what role serotonin plays in testicular function. Thus blood serotonin levels in infertile men were evaluated together with laboratory data and clinical fiindings.

MATERIAL and METHODS

Forty-five patients were subjected to the study. Fifteen of these cases were azoosperimia and the others were oligozoospermia. Blood samples were collected between 9:00 A.M. to 11:30 A.M. and the samples were frozen immediately. The samples had been stored at −20°C until determination with rapid liquid chromatography[3]. For epididymitis, and varicocele, critical evaluations were performed on each individual. Testicular volumetory was done with orchidometer based on international standard procedures. Semen analysis was perfomed at least 3 times in all the cases studied, focusing on sperm count, motility rate and semen volume. Serum FSH, LH, testosterone and prolactin were also determined simultaneously as hormonal studies and IgG, IgA and IgM were detected as immunological parameters

RESULTS

The average blood serotonin level in patients with azoospermia was 107.0±41.2 ng/dl and that in the patients with oligozoospermia was 80.1±33.0 ng/dl. The difference proved significant statistically ($p<0.05$) (Fig. 1). No statistically signifiicant difference were obtained between patients with obstructive lesion, namely chronic epididymitis and patients without epididymitis. The average level of blood serotonin in patients with chronic epididymitis was 80.3 ng/dl, whereas that of the patients without epididymitis was 92.1 ng/dl (Fig. 2). The average blood serotonin level of patients with varicocele was 83.4 ng/dl and that of patients with no varicocele was 94.0 ng/dl (Fig. 3), no significant difference being confirmed between them. The rela-

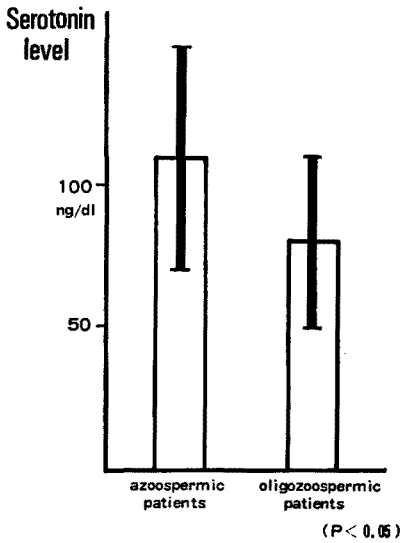

Fig. 1. Serotonin levels in azoospermic and oligozoospermic patients.
The average blood serotonin level in patient with azoospermia was 107.0±41.2 ng/dl and that of oligozoospermia was 80.1±33.0 ng/dl. The difference proved to be significant statistically ($p<0.05$).

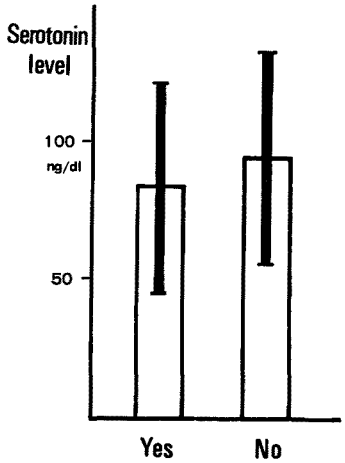

Fig. 2. Serotonin levels in patients with or without epididymitis.
The average blood serotonin level in patients with epididymitis was 80.3 ng/dl and that of the patients without epididymitis was 92.1 ng/dl. No statistically significant difference was obtained among them.

tionship between blood serotonin level and semen volume was considered remarkable but it could not be proven significant statistically (Fig. 4).

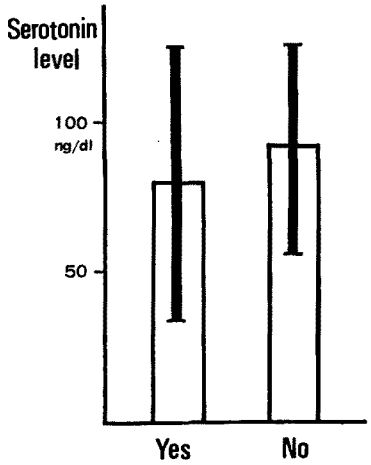

Fig. 3. Serotonin levels in patients with or without varicocele.
The average blood serotonin level in patients with varicocele was 83.4 ng/dl and that of no varicocele patients was 94.0 ng/dl. No statistically significant difference was obtained among them.

Comparative studies between serum FSH, LH, prolactin and the blood serotonin were performed but a clear conclusion could not be drawn. The serum testosterone concentrations had no relation to the blood serotonin studied (Fig. 5). Immunological parameters such as IgG, IgA and IgM proved to have no remarkable relation with the blood serotonin level.

DISCUSSION

It has been proven experimentally that the administration of serotonin can cause testis atrophic follwed by possible induction of spermatogenesis. When serotonin is admisistered to animals together with vasodilator, no remarkable changes can be seen in either the testicular size or the spermatogenesis. Taking these fact into consideration, some investigators have reported that serotonin effects on the testicular function might be due to its vasoconstrictive function resulting in diminishing testicular circulation[1]. On the other hand, some studies have proved that serotonin could disturb testosterone synthesis in the testes and spermatogenesis[2,4] Also, the fact that blood serotonin levels of the spermatic vein in the experimental varicocele were significantly higher than

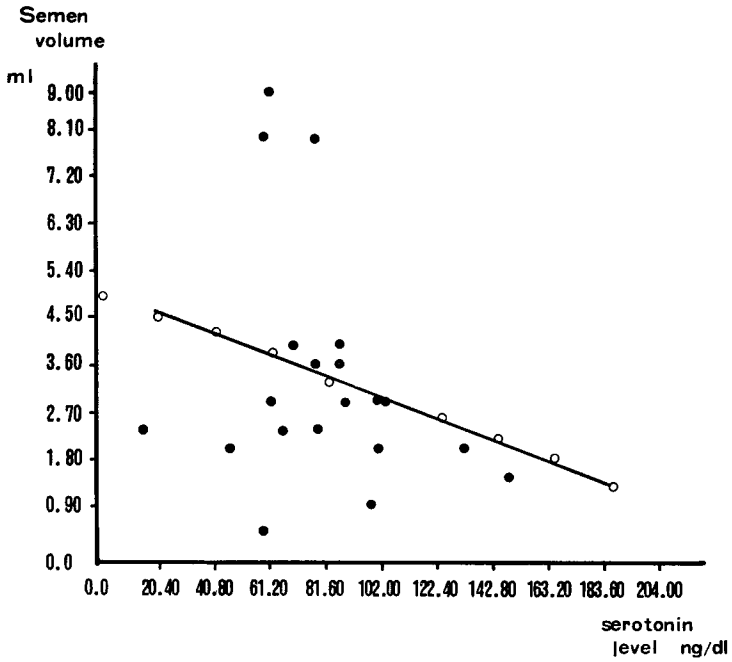

Fig. 4. Relationship between semen volumes and blood serotonin levels. It was considered remarkable but it could not be proven significant statistically.

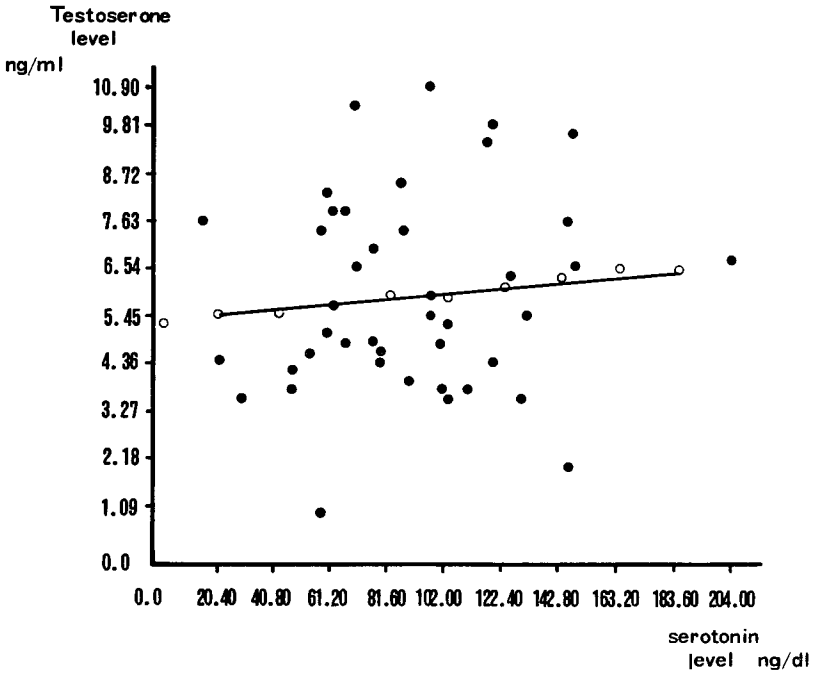

Fig. 5. Relationship between serum testosterone levels and blood serotonin levels.
The serum testosterone levels was not related with the blood serotonin level.

the controls[5] suggests there is some important relation between the blood serotonin and spermatogenesis as well as proving relationships between FSH, LH and testosterone and spermatogenesis. We have reported herein studies on relationships between the blood serotonin levels and clinical findings in male infertile patients to make clear whether or not serotonin could represent the condition of spermatogenesis.

The blood serotonin level in azoospermia patients was higher than that of oligozoospermia and it could be proved significant statistically. The fact suggests that serotonin can not only affect spermatogenesis but that it can also be an indicator delineating condition for spermatogenesis. Though no statistically significant difference could be obtained in the blood serotonin levels between either varicocele or chronin epididymitis patients and the normal controls, the fact that the former showed low levels compared with those of the normal was an interesting finding.

The epididymis plays an important role in the sperm tract and its infectious process could be one of the most popular causes of obstructive mechanism resulting in interfering spermiogenesis. Therefore, it is of value to evaluate how the serotonin relates with the obstructive lesion.

In experimental varicocele models, the blood serotonin levels in the spermatic vein have been proven to be higher than those of the normal[5], but the blood serotonin in our patients with varicocele showed lower levels. This discrepancy should be studied precisely based on serotonin's vasoconstrictive function in the future to investigate how serotonin interferes with spermatogenesis.

Although a few evaluable data that might contribute to clarify the mechanism of serotonin in affecting spermatogenesis were obtained in this study, our data suggest that mast cells could play an important role in azoospermia whatever the cause is, since serotonin is released selectively from the cells by angiotensin II[6].

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和文抄録

男子不妊症患者の血中セロトニン値について

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男子不妊症患者45名の血中セロトニン値を測定し，その他の臨床所見および検査成績と比較検討した．乏精子症患者のセロトニンの平均値は80.1±33.0 ng/dl であり，無精子症患者のそれは 107.0±41.2 ng/dl であった．これらの間には統計学的に有意差が認められた（$P<0.05$）．

また精索静脈瘤のある患者のセロトニン値の平均は 83.4 ng/dl であり，ない患者のセロトニン値は 94.0 ng/dl と後者が高く，慢性副睾丸炎などの閉塞機転のある患者のセロトニン平均値は 80.3 ng/dl で，ない患者のそれは 92.1 ng/dl でやはり後者が高かったが，それぞれ有意差を認めなかった．さらに血中セロトニン値は，われわれの検討したその他の臨床検査所見との間に相関関係を認めなかった．