



Implications of Prolactin Abnormalities on the Male Reproductive Tract and Male Factor Infertility

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ABSTRACT

Introduction: A significant proportion of male population suffer from Male Factor Infertility (MFI) due to prolactin abnormalities.

Objective: To establish the role of prolactin on the male reproductive system.

Methodology: A case control study was carried out to determine the effects of prolactin abnormalities in otherwise normal 297 males with infertility after obtaining an informed written consent. Each of the participants was subjected to a Basic Seminal Fluid Analysis (BSA) and an endocrine profile (Follicular Stimulating Hormone, Luteinizing Hormone, Testosterone and Prolactin levels). An age, Sex, height and weight matched voluntary control group was recruited for comparison. None of the cases had any medical or surgical disorder or occupational hazardous exposure which related to infertility.

Results: Among the controls mean age 33.2 years \pm 5.2, body mass index 21.4 \pm 1.39Kg m^{-2} , sperm count 34 x 10⁶, number of children fathered 2 \pm 1, Serum prolactin level 6.78 \pm 2.92mg/ml.

Of the case group 28/297 were hyperprolactinemic while 1/297 was hypoprolactinaemia. All the hyperprolactinemic patients had oligospermia, abnormal morphology of sperms, with reduced viability of the sperms. 26/28 Subjects with hyperprolactinaemia had markedly low testosterone levels. The only subject with hypoprolactinaemia had normal testosterone levels. FSH and LH levels were normal in all the participants. 29 subjects with abnormal prolactin levels were followed up for 12 months. 28 patients with hyperprolactinaemia were given oral bromocriptine (2.5mg twice daily). The response with bromocriptine was assessed with repeated Basic Semen Analysis. After 3 months of therapy 19/29 cases showed an improved response to the drug while 4/28 responded after 6 months of treatment. 1/28 took 1 year to show a response. 2 of the cases showed some improvement which fell short of normal BSA parameters.

Conclusions: Prolactin abnormalities affects male reproductive system and semen parameters. Further studies should be carried out to find the exact mechanism of prolactin on the male reproductive system.

Keywords: male factor infertility, prolactin, seminal fluid analysis

I. INTRODUCTION

Infertility is old as mankind. It affects 10-15% of the world's population. An estimated 2 million new couples are diagnosed annually where 50% of them are due to male factor infertility, of which 1% of the affected males suffer from endocrine disorders where 0.6% of them are due hyperprolactinaemia.^{1,2,3,4}

Diversified causes of male factor infertility can be classified into pretesticular, testicular and post testicular factors. Hormonal imbalances fits in to the first category⁶. The pretesticular causes accounts for up to 10% of the male factor infertility and signifies the role of Follicular Stimulating Hormone and Luteinizing Hormone and prolactin on male reproduction. The levels of prolactin have been shown to dramatically inhibit sperm production and its quality⁷. Male factor infertility is usually associated with a low sperm count⁷. The hypothalamo-pituitary dysfunction accounts for 1% of all infertile human beings¹.

II. METHODOLOGY

A case control study was carried out in private and government hospitals in southern Sri Lanka. 297 males with male factor infertility were selected as the control group. An age, Sex, height, weight matched voluntary control group was recruited for comparison. After obtaining an informed written consent each of the

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participants were interviewed with regard to their social, occupational background history following which a detailed medical and surgical history relevant to infertility was taken. A basic semen analysis was performed on each subject. None of the cases were suffering from any medical or surgical disorder or occupational hazardous exposure which results in infertility. Subjects with counts $<20 \times 10^6$ /ml were selected for the second interview and underwent a detailed medical examination. 29 subjects with abnormal prolactin levels were followed up for 12 months and followed up with repeated Basic Semen Analysis.

III. RESULTS

Among the controls mean age 33.2 years \pm 5.2, body mass index 21.4 \pm 1.39Kgm⁻², sperm count 34×10^6 , number of children fathered 2 \pm 1, Serum prolactin level 6.78 \pm 2.92mg/ml. Of the case group 28/297 were hyperprolactinemic while 1/297 was hypoprolactinaemia. All the hyperprolactinemic patients had oligospermia, abnormal morphology of sperms, and a reduced sperm viability. 26/28 Subjects with hyperprolactinaemia had markedly low testosterone levels. The only subject with hypoprolactinaemia had normal testosterone levels. FSH and LH levels were normal in all the participants. 29 subjects with abnormal prolactin levels were followed up for 12 months. 28 patients suffering from hyperprolactinaemia were given oral bromocriptine (2.5mg, twice daily) Response to treatment with bromocriptine was assessed with repeated Basic Semen Analysis. After 3 months of treatment 19/29 cases showed an improved response to the drug while 4/28 responded after 6 months of treatment. 1/28 took 1 year to show a response. 2 of the cases showed some improvement which fell short of normal BSA parameters.

IV. DISCUSSION

Since 29/297 (9.76%) out of the screened group affected with male factor infertility had abnormal prolactin levels. PRL abnormalities appear to be a significant contributory factor of male factor infertility. Both hypoprolactinaemia and hyperprolactinaemia seem to contribute to the condition. 28/29 were having hyperprolactinaemia indicating the high prevalence of hyperprolactinaemia amongst people with male factor infertility. The single (1/29) having hypoprolactinaemia shows a low prevalence of hypoprolactinaemia as a contributory factor.

Following the correction of the serum prolactin levels by administration of oral bromocriptine, sperm parameters in repeat basic semen analysis were found to be normal. It is evident that reversal of male factor infertility may be achieved by treating the underlying prolactin abnormality. The improvement of basic semen parameters can be used as an indicator of the state of infertility.

16/28 subjects with hyperprolactinaemia had marked low levels of testosterone and suffered with clinical features of low testosterone (impotence and decreased libido) which may lead to male factor infertility. Though the hormonal imbalance of testosterone was evident follicular stimulating hormone and luteinizing hormone levels were not affected in those who had hyperprolactinaemia. Thus it can be concluded that hyperprolactinaemia is associated with marked low levels of testosterone. Since follicular stimulating hormone or luteinizing hormone levels were not affected it is evident that the normal physiological rise of luteinizing hormone in response to low testosterone levels is inhibited by prolactin abnormalities.

V. CONCLUSIONS

Prolactin abnormalities affects the male reproductive system and semen parameters. Reversal of abnormal prolactin levels leads to the normalization of distorted semen parameters. Hyperprolactinaemia is associated with marked low levels of testosterone or it may lead to marked low levels of testosterone. Further morphological studies should be carried out to find out the exact role of prolactin on the male reproductive system and the effect of abnormal prolactin levels with relevance to male factor infertility.

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