

The Impact of Covid-19 Vaccines on Sperm Quality

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ABSTRACT

Objective: To determine the impact of Covid-19 vaccines on sperm quality.

Study Design: Case control study

Place and Duration of Study: Department of Diabetes & Endocrinology, Chandka Medical College Hospital Larkana from 1st July 2022 to 31st December 2022.

Methodology: Patients were enrolled as 50 those who had PCR confirmed Covid 19 history and 50 those who never got Covid-19. On this basis those cases who had a Covid-19 history were placed in group A while those who did not had Covid-19 history were placed in Group B. Patients clinical history including anamnesis, marital status, cryptorchidism, operative varicocele, or any chronic ailment were documented. A counting chamber was used for sperm count in a 100 square area. Spermatozoa was measured as either rapid-progressively motile (Type a), or as slow-progressively-motile (Type b), or as situ motile (Type c), and finally as immobile (Type d). The total semen sperm count was gained by multiplication of concentration of sperm with its volume.

Results: Volume and concentration was significantly different in both study groups. Difference in tail anomaly was also observed. In group A, it was 29.20 ± 10.26 while 27.59 ± 12.31 was the value of group B. Almost equal number of participants were married. Azoospermia was only found among Covid patients.

Conclusion: Azoospermia was only found in Covid patients and no such results were obtained from Covid negative patients.

Keywords: Spermatogenesis, Impairment, Corona virus, Congestion, Angiotensin

INTRODUCTION

Covid-19 are single stranded RNA viruses belonging to Coronaviridae family having various effects on humans. Coronavirus has caused infection in humans since 1960s. However, in late 2019 a novel coronavirus strain emerged which lead to catastrophic pandemic leading to world over loss of life. The coronavirus 19 had a resemblance with the SARS-Cov, therefore was also referred as SARS-Cov2.¹⁻³

The recent information about clinical symptoms of this disease includes fever with or without cough, nasal congestion, with complication of cardiovascular-diseases, gastrointestinal diseases, as well as pneumonia.⁴ Majority of the researches has elaborated the fact that the expression of Covid-19 is maximum in pulmonary region. It has already been investigated that angiotensin converting enzyme 2 receptor has efficacy against corona virus which is mostly present and expressed in respiratory region, it is already came into existence that ACE-2 is also responsible for spermatogonia and sertoli cells.⁵ Besides other cytopathic effects and impairment, corona virus also effect gonadal functions due to inflammatory response of the virus.⁶

Sperm concentration is also appeared to be effected and spermatogenesis is badly affected due to Covid-19. Therefore, male reproductive system got impaired and the immune response of testicular tissue adversely impact on spermatogenesis.^{7,8} Numerous studies determined the impact of Covid-19 on male reproductive system. There is still paucity of published data for the better evaluation of this impact.⁹⁻¹¹ Present study was designed to determine the impact of corona virus on sperm quality. Sperm concentration and sperm count is specifically assessed to find the association of corona virus with spermatogenesis.

MATERIALS AND METHODS

This case control study was conducted at Department of Diabetes & Endocrinology, Chandka Medical College Hospital Larkana from from 1st July 2022 to 31st December 2022. Patients were enrolled as 50 those who had PCR confirmed Covid-19 history and 50 those who never got Covid-19. All those male patients between 20-25 year who came to andrology lab on purpose of examination or required pre-conceptional screening were included in this study. On this basis those cases who had a Covid-19 history were placed

in group A while those who did not had Covid-19 history were placed in Group B. The total number of patients in both groups was 100. The samples size was calculated through application of WHO software for sample calculation using 80% power of test and 95% CI. Patient's clinical history including anamnesis, marital status, cryptorchidism, operative varicocele, or any chronic ailment was documented. Those having Covid-19 or sperm analysis within last 3 months were excluded from the study. The period of sexual-abstinence was randomly selected within 2 and 7 days in both groups based on the World Health Organization (WHO) data. The minimum semen requirement was set as 1.5ml. Thermo fisher Scientific based incubator was used for storing the semen at room temperature for 30 minutes. Liquefied-samples were placed in a laminar flow. Volume and viscosity of the samples was measured comparatively. Abnormal viscosity strands formation was longer than 2cm. A counting chamber was used for sperm count in a 100 square area. Spermatozoa was measured as either rapid-progressively motile (Type a), or as slow-progressively-motile (Type b), or as situ motile (Type c), and finally as immobile (Type d). The total number of sperms was counted inform of concentration (%a + %b + %c). The total semen sperm count was gained by multiplication of concentration of sperm with its volume. Those samples having a concentration higher 5×10^6 /ml were thanstained with a staining kit and assessed through Kruger morphology criteria. Sperm morphology was observed and recorded. Data was analyzed using SPSS version 26.0 where chi square test was applied for determining results interpretations. A value <0.001 was taken as significant.

RESULTS

The mean age of the study participants was 32.18 ± 7.24 . Volume and concentration was significantly different in both study groups. Concentration and volume appeared to be 48.19 ± 36.24 and 3.42 ± 1.62 in group B whereas it was as low as 31.78 ± 32.09 and 3.50 ± 1.42 in group A respectively. Difference in tail anomaly was also observed. In group A, it was 29.20 ± 10.26 while 27.59 ± 12.31 was the value of group B (Table 1)

Marital status of both study group was not significantly different. Almost equal number of participants was married. Azoospermia was only found among Covid patients. 4% of the Covid positive patients had azoospermia (Table 2).

Table 1: Different Parameters Comparison within Study Groups

Variable	Covid negative (n = 50)		Covid positive (n = 50)		Statistical analysis Possibility
	Mean ± SD	Range	Mean ± SD	Range	
Age in years	32.18 ± 7.24	30.0 [17.0–64.0]	31.08 ± 6.05	30.5 [21.0–51.0]	Z = 0.832 p = 0.405
Sexual abstinence (day)	3.98 ± 0.85	4.0 [2.0–7.0]	3.44 ± 0.57	3.0 [3.0–5.0]	Z = -5.275 p < 0.001
Volume (ml)	3.42 ± 1.62	3.0 [0.5–7.5]	3.50 ± 1.42	3.2 [1.0–9.0]	Z = -0.479 p = 0.362
Concentration	48.19 ± 36.24	38.0 [1.9–189.0]	31.78 ± 32.09	18.0 [0.6–167.0]	Z = -3.964 p < 0.001
Motility %	49.09 ± 17.46	52.0 [8.0–82.0]	46.93 ± 1.83	48.0 [2.0–84.0]	t = 0.841 p = 0.402
Normal morphology %	1.73 ± 1.48	1.0 [1.0–9.0]	1.76 ± 1.62	1.0 [1.0–7.0]	Z = -0.485 p = 0.628
Head anomaly %	43.38 ± 11.28	43.0 [19.0–68.0]	41.44 ± 10.46	41.0 [21.0–67.0]	t = 1.124 p = 0.263
Neck anomaly %	27.31 ± 6.88	28.0 [4.0–47.0]	27.73 ± 7.49	28.0 [13.0–43.0]	t = -0.376 p = 0.707
Tail anomaly %	27.59 ± 12.31	25.0 [8.0–76.0]	29.20 ± 10.26	29.0 [8.0–60.0]	t = -0.890 p = 0.375

Table 2: Relationship Between Marital Status and Concentration Class

Variable	Covid negative (n = 50)		Covid positive (n = 100)		Statistical analysis Possibility
	No.	%	No.	%	
Marital status					
Married	42	84.0	44	88.0	X ² = 0.374 p = 0.514
Single	8	16.0	6	12.0	
Concentration					
Azoospermia	–	–	2	4	p = 1.000

DISCUSSION

Corona virus emerged as the most lethal pandemic of the 21st century and lead to the catastrophic effects. It causes mild symptoms such as flu and cough to severe ailments and diseases including heart failure, eye infections, respiratory distress, neurological implications and sleep deprivation. Covid-19 is RNA based virus belongs to the family of severe acute respiratory syndrome. The affect people of all race and ethnic group equally. Now, various vaccines have been designed by pharmaceutical companies which promised beneficial effects and saved the life of human beings.¹²⁻¹⁵

Besides affecting various organs and causing numerous underlying health problems, studies have also reported that it also cause negative effects on male reproductive systems as well. Some studies demonstrated that corona virus impaired spermatogenesis when corona virus effect the person.¹² A study result highlighted that 4/100 Covid positive males were observed to be azospermia. Contrary, control participants had no azospermia when the results of both groups were compared. However, previous history of sperm concentration of those individuals were unknown, it is difficult to relate directly low sperm concentration with corona virus.¹⁶⁻¹⁸

The corona virus was significantly reduced the sperm concentration. When results were compared with healthy participant's sperm count and progressive motility, sperm concentration appeared to be significantly varied in Covid patients with fever as compared to without fever. In present study, sperm count was reduced in those patients who had high signs of infections than to moderate infection. In another study, sperm samples were compared on the basis of infection rate. Men who had mild and moderate infection rate also had abnormal sperm quality along with low sperm concentration.¹⁹⁻²¹

CONCLUSION

Corona virus can be the cause of gonadal dysfunction due to inflammatory response of the virus. ACE-2 receptor is appeared to be key responsible element. In present study, azoospermia was

only found in Covid patients and no such results were obtained from Covid negative patients.

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