

Interlink of Cardiovascular diseases and Male infertility; promoting lifestyle changes and naturopathy as a solution.

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Abstract

Cardiovascular diseases like ischemic heart disease, stroke, heart failure and congenital heart defects occurs through myocardial infarction and angina which mostly is caused by the atherosclerosis or stenosis or a complete occlusion of a single or more arteries have a high mortality rate. All these symptoms are related to male infertility through the underlying pathophysiological issues and the use of medicines with side effects. Different Studies have put forwarded the fact that reports both male and female infertility disorders and cardiovascular diseases have a strong association. This paper tends to focus on the fact that naturopathy and few lifestyle changes in males with minor or severe infertility issues can prevent the initiation of any cardiovascular diseases in the future.

Keywords: Cardiovascular, Male infertility, Naturopathy, Underlying, Lifestyle

1. Introduction

Male infertility is a range of health anomalies that lowers the potential of a male to fertilize or impregnate his male counterpart. According to WHO, a couple being unable to conceive even after one prolonged year of frequent and unprotected sexual intercourse can be termed as infertile (Stephen W. L et al, 2023). Almost about 20% of the infertility cases are mainly due to the sexual disorder of the male and another 30% -40% of the infertility cases occurs with male infertility being a contributing factor(Hull MG et al, 1985). Various underlying causes like endocrinological disorder, genetic mutations or abnormalities, urogenital anomalies, inflammatory diseases, environmental toxicity, usage of different drugs and medicines etc results in sexual dysfunction like anejaculation or prejaculation, impotency, erectile dysfunction etc. Apart from this, cryptochordism, testicular defects, histoarchitectural changes in the epididymis, vas deferens and other male reproductive ducts leading to azoospermia, oligospermia, asthenozoospermia and sperms with decreased motility finally results in male infertility (Winters BR et al, 2014). Factors like stress, and hyper lipidemia too causes male infertility through the increased production of ROS. Cardiovascular diseases encompass an array of ailments of the heart and the blood vessels supplying heart, brain and other vital organs. The most common cardiovascular diseases are ischemic heart disease, stroke, heart failure and congenital heart defects. Patients with ischemic heart disease suffer from myocardial infarction and angina which is caused by the atherosclerosis sometimes leading

to even stenosis or a complete occlusion of a single or more arteries. Patients with ischemic heart disease have a high mortality rate as compared to many other patients with other disorders (Antman E. M et al, 2004). Apart from this, another very serious condition of the CVD array is the stroke resulting from atrial fibrillation. Congestive heart failure on the other hand serves as the final stage for various heart defects. This cardiovascular disease has been reported to take many lives annually. Hypertension and deranged neurohormonal profiles leads to the congestive heart failures in patients. Males are known to be more prone to fatality regarding heart failures than women (Gaziano T, Reddy KS, Paccaud F, et al. 2006) Male fertility and heart diseases have been recognized as serious health concerns since time immemorial, but a possible interlink between the two has been studied only recently. Different Studies reports a linkage between both male and female infertility disorders and cardiovascular diseases, but this paper tends to focus specifically on the association of male infertility to heart diseases.

2. Association of male infertility to heart diseases.

Many recent studies have suggested a correlation between male infertility and various heart abnormalities but without a proper underlying mechanism linking them. A study by Peng Ciao Chan published in 2022 suggested that male infertility is directly linked to the risk of cardiovascular diseases in males. The study performed was a cohort study in the nationwide population of Taiwan. The study conducted involved a huge number of

populations thus indicating a strong association of infertility and CVD. Another large scale study in infertile males of Japan threw light on the fact that male infertility can be caused by lowered levels of testosterone in comparison to the normotensive counterparts. This lowered level of testosterone was also linked to a large number of patients with hypertension which is an obvious precursor of cardiovascular disease (Jeremy T C et-al, 2020). A J-shaped graph have been established between BMI and lowered sperm concentration, thus suggesting that obesity might be another link between male infertility and other cardiovascular diseases(Sermondade N et-al, 2012). Eisenberg,ML 2016 gave a report that a man already diagnosed with male infertility had an increased likelihood of developing ischemic cardiac diseases. Another recent report published in fertility and sterility stated that males and females with a history of subfertility had suffered from stroke, coronary heart disease due to myocardial infarction and angina.

3. Link between underlying mechanisms of Male infertility and Cardiovascular disease

i. Role of Hypertension in heart disease and male infertility

Male subfertility and infertility is a green signal window for future heart diseases as chronic stress causes high blood pressure which further leads to heart attacks and strokes. These phases of chronic stress can also increase the ROS in one's body which results in faulty spermatogenesis, thus leading to low sperm count, sperm abnormalities and sperms with low mobility/motility. Moreover, male infertility causes extreme psychological stress to a person which might result in the commencement of heart disease in the future. The stress is the pre-linkage that suggests the possible reason of infertile males suffering a heart attack in future/later years.

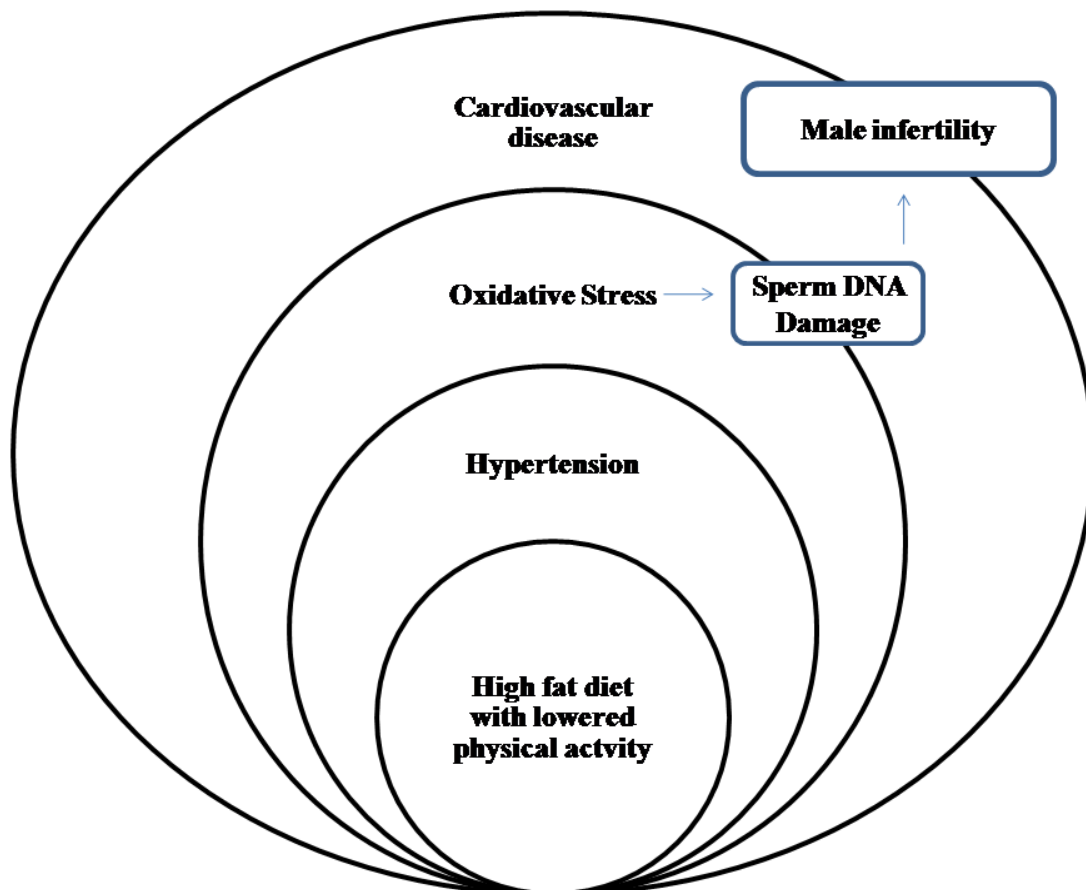


Fig A: Linking Hypertension to male infertility and cardiovascular disease

ii. Role of Obesity in heart disease and male fertility

A review by Leisageng K et al 2021 suggested that obesity with important mediators like hyperinsulinemia, hyperlactinemia, chronic inflammation and oxidative stress leads to cardiovascular diseases. These mediators can also disrupt the proper functioning of hypothalamic-pituitary-gonadal axis. Thus deregulating the testicular steroidogenesis and increased production of cytokines and

adipokines which finally causes male infertility due to low semen count and sperm abnormality. Moreover obesity can negatively impact on the various semen parameters like the sperm concentrations, motility, viability and morphology by inhibiting chromatin condensation, DNA fragmentation and increased apoptosis. Thus by managing the obesity one can reduce the chances of both male infertility and cardiovascular disease.

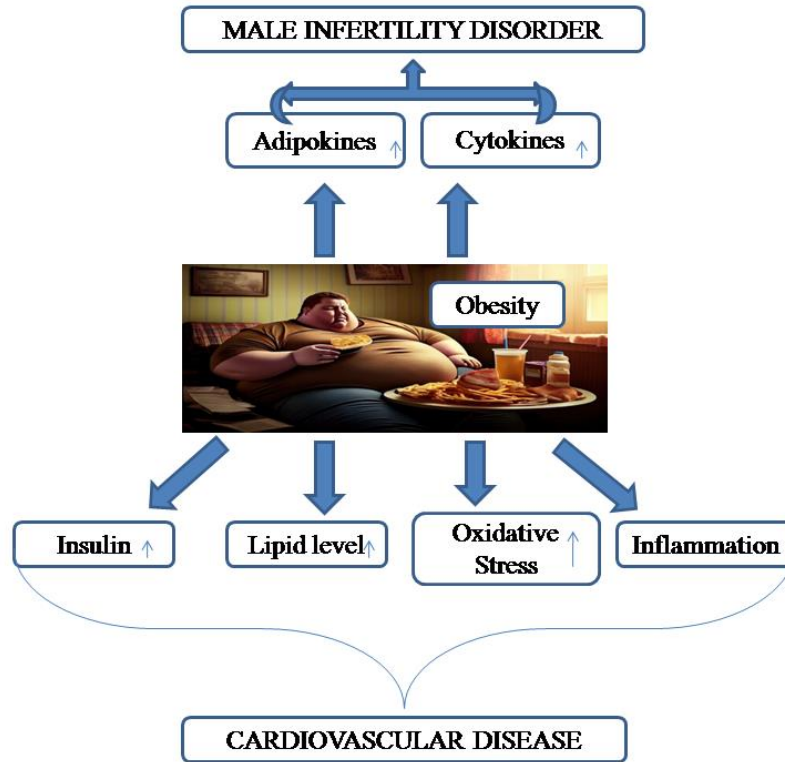


Fig 2: Link between obesity and cardiovascular diseases and Male infertility

iii. Role of Treatment of male infertility in heart disease

Various modern-day treatments of male infertility such as the ART (assisted reproductive technologies) and hormone therapies, may influence male cardiovascular health. An underlying reason of infertile males facing heart disease can be the treatment of infertility itself. Male infertility is mostly treated with the use of medicines like Anastrozole; an aromatase inhibitor, Clomiphene and Bromocriptine (Ali A Dabaja et al, 2014); a Dopaminagonist, which are known to have possible side effects in heart functions. A population based cohort study by Farzin Khosrow-Khavar reported that aromatase inhibitors increases the risk of heart failure and cardiovascular mortality. There was also a trend although insignificant towards Myocardial infarction and ischemic strokes. Although aromatase inhibitors have been chosen as an effective treatment.

against male infertility, post menopausal women and breast cancer but it also increases hypercholesterolemia, thus causing heart failure. Artificial Reproductive Technologies although do not directly affect the father adversely but the procedures can have far-reaching effects on both the mother and the child implanted through this technique. Partners of infertile males who follow ART are reported to have hypertension issues sometimes as serious as that it leads to heart diseases. Moreover the child born through ART are known to carry an array of defects like simpler issues of adiposity, differed skin-fold thickenings to more serious defects like the epigenetic defects, neurological abnormalities and congenital heart diseases (W. Chen et al, 2015)

4. Prevention of heart diseases in infertile male Management of Metabolic syndromes

Patients suffering from childlessness can prevent the possible future initiation of heart diseases. There must be an understanding that both the conditions have a pathophysiological linkage that is resulted due to the increase in ROS through obesity, hypertension, dyslipidemia etc. A person with male infertility must follow certain regulations to skip the possibilities of heart diseases. If a person is diagnosed with infertility medically, one must immediately check their lipid profile, blood pressure levels and hormone levels. These pathophysiological conditions of infertility are also cardiovascular disease precursors. Deranged lipid profile might cause metabolically healthy and unhealthy obesity which is known as one of the most preventable precursor of cardiovascular disease Rastrelli G et al.,2019. Certain lifestyle changes as a proper diet and regular exercise can be used to improve the conditions of the patients. Excessive blood pressure too must be kept in check as such a condition triggers sudden heart strokes. Prevention to an innumerable number of mortalities through heart disease or strokes can be achieved by maintaining the blood pressure levels. (Sowers, J. R et al., 2001). Moreover hormone levels, basically thyroid hormone levels have a huge impact on heart diseases as this is signified as one of the metabolic syndrome for CVD. Thus, treating the wrong levels of hormones in infertile males can check the future onset of cardiovascular diseases.

ii. Replacement of modern infertility treatment with traditional therapies

It is still a matter of contradiction if the usage of clomiphene or anastrozole used in the treatment of male infertility adversely affects the heart. But many reports have suggested that use of such modern day medication leads to myocardial infarction (Ali A Dabaja et al, 2014). Thus, promotion of traditional therapies for treatment of male infertility is an easy way to decrease the risk of future heart diseases of any kind. Traditional therapies include the herbal medicines. Asian countries especially India has been famous for the huge floral diversity. Various tribes use different ethnomedicinal plants in the treatment of the vivid range of ailments. Such an herbal approach is termed as naturopathy in various Indian literatures (Ankita Wal et al 2019). Naturopathy can be perceived as an advantageous way as it is cost effective and also devoid of any side-effects. In case of patients with male infertility this can decrease the chances of initiation of cardiovascular diseases that occurs due to the use of certain medicines or hormonal treatments. Moreover it can allow a normal birth in lieu of the births through ART thus decreasing the rates of congenital heart diseases in the children born by ART. Plants like *Mucuna pruriens*, *Tribulus terrestris*, *Glycyrrhiza glabra*, *Emblica officinalis*, *Eucommia longifolia* etc are known to improve conditions

in male infertility (Shukla K K et al, 2009) . Apart from these commonly used plants there are several others which have been tested in animal models and have a positive result. *Dactylorhiza hatagirea* has been reported to increase sperm levels by improving the hormone profiles in albino rats (Thakur M et al, 2007). Saffron has been successfully treating male infertility as reported by various groups of scientists. Proper scientific studies have proven its effect on the hormonal profiles and spermatogenesis in male (Nasibeh Roozbeh et al, 2007). Some studies have also suggested the use of a combination of certain plants in distinct doses as a treatment of male infertility. There is a great number of other plants and plant parts too that can be used as a treatment. Thus these plants can be used as a naturopathic approach towards male infertility or other such disorders which can lessen many related ailments that arises as a result of the usage of the new age modern medicines.

5. Conclusion

Death due to cardiovascular diseases can be prevented largely by understanding the interplay of male infertility and CVD. Moreover an intricate understanding of the underlying pathophysiological or metabolic conditions that makes one the window for the other is required. Treatable conditions like male infertility should be solved with more serious concern and proper devisable techniques as the underlying causes or the treatment methods might lead to more dangerous and fatal concerns like stroke or infarction. The groups of researchers must collaborate to devise proper remedies that are more natural like a routine of daily exercise or adding a proper dose of herbal medicine to their diet. More plants must be studied for its application as the medicine of male infertility but without any side effects in the heart and the vessels.

6. Authors' Contributions

Both the first and second author has contributed equally in writing, data collection and presentation of the paper and the third author i.e. our guide helped in data presentation of the paper

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