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Editorial Article

The Impact of Aging on HIV Acquisition in the Male Genital Tract

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Ageing is associated with progressive hormonal, immunological, and structural changes in the male reproductive system, including declining testosterone levels and deterioration of semen parameters. At the same time, the proportion of older men living with human immunodeficiency virus (HIV) is increasing globally. This mini-review summarizes current evidence on the interaction between ageing and HIV within the male genital tract, with emphasis on semen quality, immune status, and fertility implications. Available data indicate that while semen parameters may remain near normal in asymptomatic HIV-positive men, advancing age and disease progression are associated with reduced sperm motility, abnormal morphology, and impaired reproductive potential, particularly in the context of low CD4 cell counts. Understanding the combined effects of ageing and HIV is essential for improving reproductive health counseling and clinical management in older HIV-infected men.

Keywords: *HA1C, Diabetes mellitus, Diagnostic biomarker, Prognostic biomarker*

Adulthood is Adulthood is typically categorized into three phases: young or early adulthood (approximately 20–39 years), middle adulthood (40–59 years), and old age (60 years and older). Conversely, old age is typically divided into young old (60–75 years) and elderly (75 years and older) (von Humboldt & Leal., 2014). Ageing refers to a general, time-related degradation of an organism's biological functions, associated with a higher likelihood of disease and death (Schumacher et al., 2012). Ageing is a physiological process that occurs naturally in various body components and has been linked to a reduction in the ability to procreate. Male reproductive dysfunction brought on by aging is caused by a number of factors, encompasses vascular disorders, diabetes, infections of accessory reproductive glands, obesity, a disruption in the antioxidant defense mechanism, and the development of toxic substances (Ajayi et al., 2023; Mohamed et al., 2025). According to the WHO, there are currently over 35 million individuals living with HIV, making it one of the biggest global public health issues. 940,000 deaths worldwide in 2017 were attributed to HIV-concerned factors. Currently, HIV cannot be cured, but antiviral treatments still tried to lessen for virus's spread. HIV falls among the category of sexually transmitted infections, which are mostly spread through sexual activity and colonize and reproduce in the reproductive tracts of both men and women. The link between male infertility and sexually transmitted diseases is still up for dispute, however it is recognized that these conditions can complicate female fertility. This review focuses on how HIV infection affects the characteristics of semen in the male reproductive system, perhaps contributing to male infertility (Keerthan & Ramakrishnan, 2018). Although there aren't many surveys on HIV among people 50 and older, those that are show a significant incidence of the virus. HIV prevalence was 13% among those in their 50s and 54s, 12% among women, and 6.9% among males in their 55s and 60s, based on a national HIV study conducted in 2012 (compared to 18% of those in the 15–49 age range) (Shisana et al., 2012). According to a nationwide population-based survey conducted in Swaziland in 2006–2007, Compared to 27% of people aged 15–49 years, 13% of male and 7% of female aged 60–64 years had HIV.

HIV prevalence in Kenya was 5.0% among those between the ages of 50 and 64 (vs 7.4% among those between the ages of 15 and 49) (Maina et al., 2014One in six Americans, or 51% of the total, had HIV in 2020 and were 50 years of age or older, with 17% being new cases. (Jaqua et al., 2022). In male, maturing related alterations in the hypothalamic-pituitary-testicular hub at every level, remembering adjustments for the GnRH beat generator, gonadotropin emission, testicular steroidogenesis, and circling testosterone focuses caused either straight by sequential maturing or in a roundabout way by maturing related changes in everyday wellbeing, body structure, active work, and lifestyle8. The primary anabolic substance in men is testosterone (T), which also a central member in keeping up with ordinary regenerative and sexual capability. The populace serum T level mean decreases with maturing as a result of the maturing system way of life comorbidities and alterations, albeit the progressions in serum T differ significantly between people (Kaufman and Vermeulen, 2005). A HIV tainted man has specific sperm boundaries that reflect fruitfulness is fundamentally hindered. Semen boundaries are inside the typical reach Among males with HIV who do not exhibit any symptoms, but ordinary Sperm motility and morphology are reduced with disease movement. Sperm boundaries and CD4 count correspond emphatically that recommends that people with a stretch of comprehensive Guides are least rich than recuperating HIV-1 tainted men (Vandermaelen & Englert, 2010). Age-subordinate decrease in sperm quality. Age was associated with minimal direct reductions in semen volume, total sperm count per ejaculation, progressive motility, moderate motility, and normal morphology (Stone et al., 2013). The noticed negative relationship amongst maturing and semen records adds to male fruitlessness and conceptive decline (3). Maturing is joined by mild decline of sperm and egg quality within fruitfulness. Populace average levels indicate a gentle all out testosterone (T) decline, a more extreme free T decrease, with a mild Luteinizing chemical (LH) increment and significant commitment of comorbidities with these modifications. The connection between serum T and body composition, as well as metabolic health, is reciprocal. Skeletal alterations are primarily associated with estradiol. Albeit restricted proof connections moderate androgen declines with burdensome side effects. Dihydrotestosterone (DHT) has been related with expanded hazard of stroke, while a relationship with mortality presumably mirrors that low testosterone indicates poor health (Kaufman et al., 2019). The pace old enough related decrease in testosterone levels is impacted by the presence of constant ailment, adiposity, prescription, examining time, and the techniques for testosterone measurement (Bhasin et al., 2022).

Conclusion

Ageing and HIV infection exert overlapping and potentially synergistic effects on the male genital tract, contributing to hormonal imbalance, immune dysfunction, and declining semen quality. The increasing HIV prevalence in male over 50 and older highlights the need for greater clinical attention to age-related reproductive and sexual health issues inside this group. Further focused study is necessary to clarify underlying processes and to guide age-appropriate fertility and HIV care strategies.

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