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Review Article

Advancements in Male contraceptives: A flanged approach in family planning

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ABSTRACT

According to 2019 reports, WHO estimated that around 214 million women of reproductive age in developing regions have an unmet need for contraception either due to limited needs or availability. With the aid of Aritifical Intelligence we can find other alternatives and also possbile approaches for Contraception The aim of this review article is to emphasize the need for combination of testosterone and nestorone in male contraceptives. The use of contraception is a widely acknowledged method of population control. Women have always been the main target of hormonal contraceptive treatments. The use of hormonal and non-hormonal techniques for male contraception is a desirable choice. Testosterone-based hormonal contraception has had positive outcomes. Reversible techniques of male contraception without hormones, such as reversible sperm suppression with guidance, are extremely promising. This manuscript tries to encompass various methods of contraception like hormonal and non-hormonal which would serve in efficient contraception.

1. Introduction

People can use family planning to have the amount of kids they want, if any, and to space out their pregnancies. Infertility therapy and the usage of contraceptive techniques are used to achieve it.[1] Seven well-known ML algorithms, such as logistic regression (LR), random forest (RF), naïve Bayes (NB), least absolute shrinkage and selection operation (LASSO), classification trees (CT), AdaBoost, and neural network (NN) were applied to predict contraceptive practice. Contraception decreases unwanted pregnancy rates, which also decreases the need for risky abortions and the risk of HIV transmission from mothers to their unborn children. Also, it can help girls' education and give women additional chances for social participation, including paid jobs. Although there is widespread agreement that males require access to reliable contraceptive treatments that can be reversed, the field has yet to generate any successful male choices. Since healthy testosterone levels must be maintained while nearly all sperm production is suppressed, male hormonal contraception must succeed.[2] Unplanned pregnancy rates are high and steadily increasing over the world, which is difficult for women, families, and the environment. Global inequities for women are made worse by local restrictions on access to contraception and abortion services.[3] Even with increased access, prior studies on the effectiveness of contraceptives in couples have shown that hormonal male methods are effective and reversible. However, many women experience side effects from currently available contraceptives or have medical conditions that prevent them from using them. While male-directed contraceptive methods account for 16% of current worldwide contraceptive usage (condoms, vasectomy, and

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withdrawal) (6% in Africa, 29% in North America), male contraceptive use is inconsistent over the world and hindered by few options and high rates of technique failure (condoms, withdrawal). Vasectomy is a successful procedure, but it is invasive, mostly irreversible, and needs a highly competent practitioner, which limits the number of people who would utilize it. Male contraceptive solutions that are both reversible and permanent are long overdue.[4] Findings of a little research showed that when suitable contraceptive techniques are made available, the growing focus that men should be more involved in family planning would be supported.[5] In 2002, surveys of over 9000 males between the ages of 18 and 50 were conducted in nine nations across four continents. The goal was to compare men's understanding, attitudes, and acceptance of MFC across cultures and gauge their readiness to employ such a procedure.[6] In addition to supporting androgenic male physiology, the use of an androgen enhances gonadotropin suppression, more effectively inhibiting spermatogenesis in men.[7] Several different forms of male contraception are now being developed, with oral formulations being one of the choices. A substance with considerable potential is dimethandrolone (7, 11-methyl-19-nortestosterone) undecanoate (DMAU).[8] For the past 50 years, the majority of hormonal male contraceptive studies have focused on longer-acting hormonal medications given by a physician (i.e. implants, intramuscular injections). Transdermal gels delivering a novel progestin, segesterone acetate (also known as Nestorone®), and testosterone to inhibit sperm production have been evaluated in research funded by the Eunice Shriver Kennedy National Institute of Child Health and Human Development (NICHD) in collaboration with the Population Council. Compared to injections and implants, this transdermal NES/T gel has the potential to provide users greater independence and less pain, and it has few adverse effects while delivering physiologic levels of androgens.[9,10] Some men who use experimental hormonal male contraceptives may have negative side effects, much like women who use hormonal contraceptives do. A small percentage of males encounter side effects, which are similar to those that women who take hormonal treatments experience and can endure. They include some weight gain, mood swings, and libido effects. Early hormonal male contraceptive effectiveness trials used intramuscular testosterone dosages that were above physiologic limits. Significant increases in hematocrit, creatinine, and triglycerides were among the androgenic adverse effects that some patients reported across the studies. Lack of regulatory direction, which restrains both scientific and monetary investment, is a significant barrier to the advancement of male contraceptive research. While efforts are being made to provide efficient and well-tolerated medicines, it is unclear whether first approval of the first hormonal male contraception will be deemed acceptable by regulatory bodies like the US Food and Drug Administration (FDA) and the European Medicines Agency (EMA).[11]

Testosterone-based hormonal contraception has had positive outcomes. Reversible techniques of male contraception without hormones, such as reversible sperm suppression with guidance, are extremely promising[12]. Injectable testosterone undecanoate (TU) in tea seed oil was evaluated for its safety, contraceptive effectiveness, reversibility, and practicality as a hormonal male contraceptive, and the results were significant.[13]

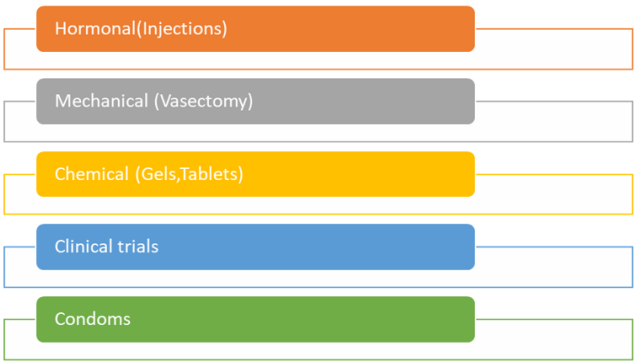

Fig. 1: Methods of male contraception

2. Literature Review

Suppression of spermatogenesis to azoospermia or severe oligozoospermia (< or = 3 x 10(6)/mL) induced by weekly T enanthate injections results in sustained, reversible contraception with good efficacy and minimal short-term side effects. New hormonal regimens with more convenient delivery and improved spermatogenic suppression would provide practical male contraception.[14] Male hormonal contraceptive development has progressed significantly over the past three decades. Intramuscular injections of testosterone undecanoate alone provides adequate efficacy in Chinese men with a contraceptive failure rate of 1.0 and 1.1 per 100 men at 12 and 24 months respectively with few adverse events.[15] Surveys indicate that one form of acceptable male hormonal contraception would consist of injections given at 2- to 3-month intervals. This report described a study of depot medroxyprogesterone acetate (DMPA) and testosterone undecanoate (TU) injected at 8-wk intervals for suppression of spermatogenesis in healthy Chinese men and fewer side effects were observed.[16,17] Hormonally azoospermia convinced by daily IM injections of testosterone enanthate provides effective and reversible manly contraception, but more practical rules are demanded. Given are former findings that six 200- mg bullets implanted subdermally produced more stable, physiological T situations and reduced the delivered T cure by further than 50 while maintaining inversely effective repression of sperm affair with smaller metabolic side- goods than daily

200- mg testosterone enanthate injections.[18] Treatment with 1000 mg testosterone undecanoate fitted at 6 daily intervals or in combination with levonorgestrel showed repression of spermatogenesis similar to daily injections of 200 mg testosterone enanthate. Because of its long half- life and in the absence of severe side- goods, testosterone undecanoate can be considered as first choice testosterone ester in farther studies of hormonal manly contraception.[19] Recent trials for hormonal manly contraception are grounded on gestagens or GnRH antagonists combined with oral or injectable testosterone negotiation. still, the efficacity of utmost trials remained disappointing. Norethisterone enanthate (NETE) has been used as a long- acting injectable womanish contraceptive and has shown sustained repression of spermatogenesis in manly monkeys and dragged repression of gonadotropins in men.[20]

3. Methodology

Some option other than hormonal Contraception are[21–24]

1. AdjudinIt's a emulsion that functions as a contraceptive by dismembering the adhesion of spermatids to Sertoli cells, causing unseasonable spermiation and gravidity.
2. H2- GamendazoleH2- Gamendazole is a emulsion that works by injuring the function of the apical ectoplasmic specialization.
3. Retinoic acid binds one of several retinoic acid receptors(RARs, which regulate gene expression
4. BMS- 189453BMS- 189453 is an orally active retinoic acid receptor antagonist. The new medicine uses two hormones. originally, progestin aka Nestorone also known as segesterone acetate(NES), a synthetic form of the steroid/ hormone progesterone that women's bodies use to regulate ovulation and gravidity. The purpose of the progestin in the new experimental manly birth control is to lower sperm count. But to help the progestin from negatively impacting the men's coitus drive or causing other changes like increased acne or weight gain. The alternate hormone present is testosterone (T). That may sound ineffective since testosterone plays a part in sperm product, but actually when a man's body gets testosterone from an outside source, the testes stop producing it and sperm count drops as well. maybe stylish of all is that this gel is intended to be rubbed on the arms and shoulders.[25,26] An existent would have to apply 2.5 mL of the contraceptive gel on each shoulder and upper arm every day(aggregate of 5mL). As it contains 62 mg T(6 mg absorbed) and 8 mg NES(0.8 mg absorbed). And one must use the gel after taking a shower in the morning and leave it on their skin for at least 4 hours before washing.[27,28] A irk- on gel is a far gentler delivery system than a lozenge, vaginal ring, IUD, implant, injection, or any other type of hormonal birth control that women now have access to. On an average men produce,000 sperm every alternate and are constantly spewing out DNA pellets. To insure that all of those small meiosis tadpoles are reduced to respectable situations and for that guys will use the gel solely for a time and also their sperm counts will drop to an respectablelevel.The trial is anticipated to be completed by 2023, and if everything goes well, it'll do further testing. Yet further exploration involving thousands of men would be needed before this gets authorized by the US Food and Drug Administration and also give it a green flag.[28] Hormonal Manipulation is vital for the manly contraception.

4. Conclusion

A implicit benefit of the synergist combination could prove to be a boon in family planning This review lays the root for farther exploration on the need for manly contraception. In the coming unborn manly contraceptives can be a vital volition for family planning bias and prove to be a paradigm shift in operation ofcontraception. Current exploration is concentrated on both perfecting the system and characteristics of androgen administration and chancing combinations with progestins that optimize sperm count repression in all populations while minimizing side- effects

5. Future Scope

More and More research upon incorporating NDDS either in form of Niosomes, Liposomes, Dendrimers or Transfersomes in Microneedles for Transdermal patch

6. Conflict of Interest

None.

7. Source of Funding

None.

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