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EFFECTIVENESS OF YOGA DURING PREGNANCY AND IN STEM CELL MOBILIZATION

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ABSTRACT

Human Umbilical Cord Blood (hUCB) is considered as good sources of stem cells with least ethical issues as it is routinely discarded as waste material. Potential of these stem cells in treating neurodegenerative disorders and other blood related disorders has been already tested in animals and humans. After the first successful transplantation using hUCB in 1988 for reconstitution of hematopoiesis in a patient with Fanconianaemia, transplantation using hUCB derived stem cells has been used for the treatment of various diseases such as malignant and non malignant diseases. Though these multipotent stem cells have greater potential to differentiate into variety of cells but still the stem cells derived from single cord blood unit is not found to be sufficient for an adult transplantation. Yoga has been already shown to increase the stem cells in peripheral blood, it may have effect on UCB stem cells too and UCB derived stem cell efficacy may increase after practicing Yoga. Stems cells with the increased efficacy can be a great application for future transplantations for treatment of various life threatening disorders. Apart from stem cells, expectant mother suffer from many pregnancy related complications which can affect fetus and pregnancy outcome. There are many evidences of Yoga being a good mean to reduce stress, anxiety and depression and also reduce many pregnancy related complications. Therefore Yoga during pregnancy can be very effective in both reducing complications and increasing pregnancy outcomes.

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INTRODUCTION

Stem cells are self renewing cellsthat can give rise to more stem cells and havecapacity of differentiation, which make them capable of differentiating into tissues of many different lineages under suitable conditions [1].

Stem cell transplantation is a good therapeutic alternative to treat many life-threatening disorders. Bone marrow derived and UCB derived stem cells were found to be considered as main sources of stem cells[2]. If compared to the bone marrow derived stem cells, UCB stem cells have higher capacity of proliferation and UCB can also be obtained with less invasive procedure compared to bone marrow [3].UCB stem cellsare an attractive source of cells for transplantationbecause they are easily available with less risk of infection and tumorgenicity, have no ethical concern, can be expanded easily and they can migrate to the site of injury when introduced in the peripheral circulation [4,5].

Research has shown the increased mobilization of stem cells in peripheral blood and bone marrow after endurance exercise [6]. Exercise potentially elevated the quantity and quality of stem cells in bone marrow niche and this is associated with increased activation and differentiation of hematopoietic stem cells [7]. Besides only physical exercise, Yoga which includes breathing exercise combined with stretching and some physical postures is also associated with repair of damage and regeneration of tissue by stem cell trafficking from bone marrow to peripheral circulation [8].

During pregnancy also, prenatal exercise increase the level of endothelial progenitor cells in UCB and decrease putative breast stem cells which indicates improved cardiovascular fitness of infant and decreased chances of breast cancer respectively[9]. A randomized controlled trial shows the decreased cesarean and instrumental delivery incidences followed by prenatal exercise [10]. Exercise during pregnancy decrease the incidences of preterm birth [11].

Sedentary lifestyle during pregnancy leads to hypertension, maternal and childhood obesity, gestational diabetes, dyspnoea, and pre-eclampsia. But regular physical activities during pregnancy are beneficial for both maternal and fetal

health.During pregnancy, regular exercise and physical activity help to maintain mood swings, reduce pain of muscle cramps and lower limb oedema, reduces risk of gestational disorders such as diabetes mellitus and hypertension and fetal benefits include decreased fat mass, improved stress tolerance, and advanced neuro-behavioural maturation[12].

According to American college of Obstetricians and Gynecologists practicing Yoga, exercise or physical activity for at least 30 minutes, thrice a week results in normal delivery[13]. Although physical exercise during pregnancy is associated with many benefits but, not necessarily it may adversely affect pregnancy due to combination of stress from pregnancy and exercise, especially redistribution of uterine blood flow, oxygen and hyperthermia can pose potential threat to fetal growth and development [14].

As mentioned above, Yoga is combination of stretching exercises, postures, deep breathing and meditation, has become a popular among both adults and young population and also in pregnancy to overcome from complications [15]. Yoga during pregnancy is considered as safe and effective intervention [16].

Integrative Yoga approach is safe during pregnancy and is not associated with any complications. It improves birth weight with decrease in preterm labour and intra uterine growth restriction (IUGR) [17]. Yoga, if started in early pregnancy (2^{nd} trimester), decrease physical pain associated with pregnancy and also reduce stress and anxiety even if practiced during late pregnancy (3^{rd} trimester) [18].

Polis et al (2015) determined the effect of Yoga on maternal and fetal health in healthy women in third trimester and all the postures were safe and well done by women without any adverse maternal effect and fetal heart rate changes [19]. In a randomized control trial (RCT) of 66 women, labor pain and duration of labor was decreased significantly when compared to the control group [20].

Even in high risk pregnancy, Yoga is an effective therapy to reduce hypertensive disorders and increase fetal outcome, Lower incidences of Pregnancy Induced

Hypertension (PIH), Pre-eclampsia (PE), Gestational Diabetes (GDM) and Intra Uterine Growth Restriction (IUGR) were found in Yoga group as compared to control group [21]. Yoga becomes a safe treatment to overcome from high risk pregnancy complication, as it is associated with healthy progression of platelets and uric acid level and hence decreased chances of PIH and PE [22].

Prenatal yoga help to reduce pelvic pain and enhances mental condition by reducing stress, depression, anxiety and also improve labour pain at the time of delivery and perinatal outcomes (obstetrical complications, delivery time) [23]. Antidepressant taken at the time of pregnancy may induce preterm birth [24] but Yoga practice can be used to reduce stress and depression during pregnancy and hence will helpful in reducing the preterm birth incidences. Yoga and family support help in reducing depression, anxiety, anger, back and leg pain during pregnancy [25].

Above literature provides strong evidence regarding the safety and benefits of Yoga during pregnancy. Many pregnancies related complications can be reduced simply by adopting Yoga as a lifestyle during pregnancy. Even Yoga has been shown to be effective and safe in high risk pregnancy and it is recommended for normal pregnancy and delivery. Evidences also show the effectiveness of Yoga and physical exercise in escalating the mobilization of stem cells in circulating blood and UCB.

CONCLUSION

Regular Yoga Practice is found to be cost-effective, easy to perform during pregnancy as it is not associated with any co-morbidity. Yoga is helpful in reducing many pregnancy related complications such as PIH, PE, IUGR, preterm births, stress, anxiety and associated physical pain. Yoga also increases the stem cell mobilization in peripheral blood and UCB.

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