

## Place Value of Chemotherapy during Pregnancy

Dimpee Verma\* and Jyotsna Verma

Department of Gynecology & Obstetrics, Institute of Home Economics, 88-A block- U&V Shalimar Bagh, Delhi, India

\*Corresponding author: Dimpee Verma, Department of Gynecology & Obstetrics, Institute of Home Economics, 88-A block- U&V Shalimar Bagh, Delhi, India, Tel: 9711648876; E-mail: dimpee64gparle@yahoo.com

Received date: February 04, 2018; Accepted date: April 18, 2018; Published date: April 25, 2018

Copyright: © 2018 Verma D, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Abstract

Approximately, 1 in 1,000-2,000 pregnancies today is complicated by cancers such as Breast, Cervical, Lymphoma or Melanoma; whose treatment is centralized to Chemotherapy via certain cytotoxic and other drugs. BUT, IS CHEMOTHERAPY DURING PREGNANCY REALLY A WISE CHOICE?

Depending upon the Impact of pregnancy on the outcome of cancer, Gestational age and risk of metastasis to the placenta and fetus, and Safety of treatment; chemotherapy is suggested which ironically, yields an increased risk of birth defects. Certain cancers like Hodgkin Lymphoma and Breast cancer can have their treatment delayed, until delivery by giving steroids and till the completion of first trimester, respectively. But Cervical and Melanoma cancers require an urgent treatment due to their high metastasis property. In cervical cancer, chemotherapy starts only after the termination of pregnancy as the Uterus itself gets affected. While in melanoma, Placenta and Fetus are the targets due to certain hormonal changes.

The greatest risk to the fetus occurs during the first trimester as it is the Critical stage of its development, especially when chemotherapy involves anti-metabolite drugs. Such cytotoxic agents interrupt metabolic pathways by destroying macromolecules of tumor as well as of normal tissue, thereby interfering with DNA and RNA synthesis. As a result, it leads to systemic toxicity and teratogenicity. These conditions cause defects like ventriculomegaly, bicuspid aortic valve, high arched palate, limb malformations, necrotizing enterocolitis in the fetus. Moreover, there is also the risk of infection and hemorrhage caused by Myelosuppression chemotherapy that causes lowering in Red Blood Corpuscles, White Blood Corpuscles and Platelet count.

Thus, in all such cancers and their therapies, the primary concern remains centralized – Exposure of fetus to the therapy and its wellbeing. There is a need to benefit chemotherapy during the course of pregnancy at a place, where it acts as a boon for both the mother as well as the developing fetus.

**Keywords:** Chemotherapy; Cytotoxic Agents; Systemic Toxicity; Teratogenicity

### Themes

1. Prevalent cancers during pregnancy
2. Effect of chemotherapy on developing fetus

### Introduction

Today, Cancer being the most prevalent disease affects not only the normal population but to the pregnant women also thus, causing a threat to two lives at the same time. This increasing rate has brought an increment in the mortality and morbidity ratio of both – mother as well as fetus. Observing the social, economic and ethical factors, the countries world over prefer CHEMOTHERAPY as the most satisfying and promising way to treat cancer. BUT, IS CHEMOTHERAPY DURING PREGNANCY REALLY A WISE CHOICE???

### Cancer during pregnancy

Approximately, 1 in 1,000-2,000 pregnancies today are complicated by cancer [1]. Prevalent cancers during pregnancy are Breast, Lymphoma, Cervical and Melanoma. If the cancer gets diagnosed

within a few weeks of the due date, it may be possible to delay the start of therapy until after delivery, eliminating any possibility of risk to the fetus [2]. But ironically, often pregnancy delays the diagnosis, causing it to get discovered at a more advanced stage.

### Breast cancer

Its diagnosis gets complicated by the physiological changes in the breast and therefore, need to avoid ionizing radiation. These factors together with the need for general anesthesia also complicate the locoregional treatment [3]. Large no. of malignant tumors and high rate of tumor cell proliferation do not allow a delay in its treatment for a long period of time. That is why; chemotherapy is preferred only after the first trimester keeping in focus, the fetus wellbeing.

### Hodgkin lymphoma

This occurs mostly to the people between 15-34 years of age (childbearing years) thus, making it a requirement to go for the treatment. If chemotherapy is given during the pregnancy, the possibility of miscarriage and still births increases [4]. As it is non-malignant in nature, it is usually delayed until after first trimester or until delivery, if possible, to lower down the risks for fetus. For the same, steroids are given which are considered safe.

## Cervical cancer

It is the most commonly diagnosed gynecological malignancy during pregnancy that doesn't leave even the uterus in its metastasis. The treatment therefore, is the most challenging where termination of pregnancy becomes the primary requirement [5].

## Malignant melanoma

Malignant melanoma metastasises to the placenta as well as fetus very frequently due to hormonal changes that occur during pregnancy [6]. If chemotherapy is given during first trimester, the baby after birth, develops bowel perforation due to necrotizing enterocolitis and dies at the age of 3 months due to septicemia.

## Chemotherapy and pregnancy

All such cancers and their therapies have main focus on Exposure of fetus to the therapy and its wellbeing. Therefore, depending upon the Impact of pregnancy on the outcome of cancer, Gestational age and risk of metastasis to placenta & fetus, and Safety of treatment, chemotherapy is generally preferred by the doctors after first trimester ensuring the healthy development of fetus [6].

The cytotoxic drugs given to the pregnant woman as a part of chemotherapy, interrupt metabolic pathways by destroying macromolecules of both tumor as well as normal tissue. Thus, they interfere with DNA and RNA synthesis, resulting in systemic toxicity and teratogenicity.

Their effects could be seen in the neonate in the form of defects like ventriculomegaly, bicuspid aortic valve, high arched palate, limb malformations, abnormal vena cava, etc. There is also the risk of infection and hemorrhage caused by myelosuppression chemotherapy that ultimately, causes lowering in the RBCs, WBCs and platelet count (2). Long term effects include gonadal dysfunction & infertility, impaired physical & neurological development, and germ-cell mutagenesis resulting in carcinogenesis and teratogenicity in subsequent generations [3].

Therefore, to ensure the developing fetus's health, chemotherapy is given to the pregnant women second trimester onwards as there is growth of placenta that acts as a barrier for drugs between mother and fetus [4].

### Points to remember

1. Cancer patients are advised to use barrier methods of birth control (like condoms) as chemotherapy interferes with the effectiveness of hormone-based contraception (like pills).
2. Women receiving chemotherapy should not go for breast feed as drugs can pass through the breast milk.

3. If a woman becomes pregnant while she is receiving chemotherapy, she may need to terminate her pregnancy.
4. Women who may be pregnant should inform their oncologist before getting any therapy.
5. Most female cancer survivors should wait 2 years after the end of treatment so as to allow for fertility recovery as well as lessens the chance of relapse [2].

**Other suggested therapies:** *Radiation Therapy:* It is given only if the fetus shields itself sufficiently from direct and scatter radiation [2]. MRI and Ultrasound should be preferred for imaging studies. This therapy is safe during 1st and 3rd trimester [1].

*Surgery:* It can be performed and is safe during all trimesters (1). The main risk is from anesthesia as discussed earlier (breast cancer). Abdominal surgery, however, can be more complicated [2].

## Conclusion

There is a need to visualize more carefully about the consequences of chemotherapy for the fetus and the ways to minimize them. We want our generations to be healthy in all terms and therefore, there is a need to benefit chemotherapy during pregnancy at a place, where it acts as a boon for both mother as well as fetus.

## Acknowledgement

I would like to express my gratitude to all my college teachers to give base for further using this knowledge on chemotherapy during pregnancy in medical field. I would also like to thank Dr. Jyotsna Verma for critical discussion and helping me out in this article.

## References

1. Dekrem J, Van Calsteren K, Amant F (2013) Effects of fetal exposure to maternal chemotherapy. *Paediatr Drugs* 15: 329-334.
2. Sophie McGrath E, Ring A (2011) Chemotherapy for breast cancer in pregnancy: evidence & guidance for oncologists. *Ther Adv Med Oncol* 3: 73-83.
3. <http://www.lymphomas.org.uk/about-lymphoma/treatment/treatment-lymphoma-during-pregnancy>
4. Sileny Han N, Gziri MM, Van Calsteren K, Amant F (2013) Cervical cancer in pregnant women: treat, wait or interrupt? Assessment of current clinical guidelines, innovations and controversies. *Ther Adv Med Oncol* 5: 211-219.
5. Mariam M (2009) Metastatic Malignant Melanoma during Pregnancy. *Sultan Qaboos Univ Med J* 9: 79-83.
6. RM Peres, Sanseverino MTV, Guimarães JLM, Coser V, Giuliani L, et al. (2001) Assessment of fetal risk associated with exposure to cancer chemotherapy during pregnancy: a multicenter study. *Braz J Med Biol Res* 34: 1551-1559.