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Study the Effect of Anticoagulant Drugs on Pregnancy

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Abstract

Blood clotting during pregnancy is a health challenge facing many pregnant women, as it can lead to serious complications that threaten the lives of both the mother and fetus. In this context, blood thinners (Anticoagulants) are one of the medical solutions used to prevent and treat blood clots. However, the use of these injections raises many questions and concerns about their effects on pregnancy, the safety of the mother and fetus, and potential side effects.

In this study, data were collected using a questionnaire containing 16 questions. The questions aimed to understand the effect of anticoagulant injections on pregnant women from multiple aspects. The questionnaire was then distributed to the targeted women who had previously taken anticoagulant treatment during pregnancy. The total number of targeted cases was 80 cases. This was done in cooperation with Al-Watan Medical Clinic and Al-Shifa Clinic in the city of Hun in the Al-Jufra region of Libya during the period from 04/2024 to 06/2024. The results gave different indicators. For example, the indicators were negative regarding the presence of health problems that required the use of anticoagulant medications before pregnancy, the use of anticoagulant medications during pregnancy, the occurrence of complications related to the kidneys and liver, the use of any additional procedures or examinations to monitor the health of the fetus due to the use of anticoagulant medications, and the occurrence of miscarriage due to taking anticoagulant medications during the first months of pregnancy. On the other hand, for example, the indicators were positive regarding the presence of problems during pregnancy attributed to the use of anticoagulant medications, and the doctor provided special advice regarding taking anticoagulant medications during pregnancy, receiving special guidance regarding the use of anticoagulant medications during pregnancy, and the doctor provided special advice regarding taking anticoagulant medications during pregnancy.

Keywords: Anticoagulant, pregnancy, Blood, Drugs, woman

1. Introduction

Pregnancy is one of the most important and delicate periods in a woman's life, as it requires special attention to maintain the health of the mother and fetus. Among the medical procedures that may be recommended to some pregnant women is the use of anticoagulant injections, which play a vital role in preventing blood clots. This delicate stage includes multiple physiological changes in a woman's body that require continuous medical monitoring and care to ensure her safety and the safety of the fetus.

Anticoagulant injections are usually used for pregnant women who suffer from certain health conditions such as a previous history of blood clots, hereditary clotting disorders, or some chronic medical conditions such as heart disease. These conditions make women more susceptible to the formation of

blood clots, which may lead to serious complications such as recurrent miscarriage, deep vein thrombosis, or pulmonary embolism. Anticoagulant injections reduce the risk of these blood clots by improving blood flow and preventing platelet aggregation.

However, the use of anticoagulant injections during pregnancy is not without challenges and risks. One of the most important of these risks is the increased possibility of bleeding, whether internal or external, which may pose a threat to the life of the mother and fetus. In addition, pregnant women who use these needles may need close and continuous monitoring by specialist doctors to avoid any potential complications and ensure the effectiveness and safety of the treatment.

Managing blood thinners during pregnancy requires close collaboration between the pregnant woman and her medical team. Pregnant women who are prescribed these injections must be fully aware of the effects and potential risks of the medications. This includes understanding the appropriate dosages, when to schedule medical checkups and follow-ups, and how to recognize the signs and symptoms of bleeding or clotting. In addition to medical care, psychological and emotional support plays an important role in the life of a pregnant woman who uses blood thinners. A woman may experience feelings of anxiety or fear about the effect of medications on her pregnancy, and this is where family and friends come in to provide support and assistance.

The importance of the study is represented in several points, which are as follows:

1. **Improving health care for pregnant mothers:**

- Helping improve the understanding of doctors and specialists of the effects of anticoagulant injections on pregnancy, enabling them to provide safer and more effective health care for pregnant women.
- Providing scientific evidence that contributes to the development of customized treatment protocols that take into account the individual needs of pregnant women who suffer from health conditions that require the use of anticoagulants.

2. **Reducing risks and complications:**

- By understanding the benefits and risks associated with the use of anticoagulant injections, preventive measures can be taken to reduce the risk of bleeding and other complications, which improves pregnancy outcomes for the mother and fetus.
- Providing valuable information that enables doctors to distinguish cases that require the use of anticoagulant injections from those that can be avoided, thus reducing unnecessary use and reducing the risks associated with it.

3. **Promoting health awareness and education:**

- Contributing to increasing the awareness of pregnant women and their families about the importance of preventing blood clots, and how to use anticoagulant injections safely.
- Providing the necessary information for women to make informed decisions about the use of these medications which enhance trust between the patient and the health care team.

4. **Supporting evidence-based health decisions:**

- Providing scientific data and evidence to support evidence-based health decision-making in the field of using anticoagulants during pregnancy.
- This enhances the ability to formulate health policies based on modern scientific knowledge, which contributes to improving health care standards.

5. **Directing future research:**
- Identifying current knowledge gaps and suggesting new areas for future studies which contribute to directing scientific research efforts towards urgent and important issues.
- It can contribute to the development of new drugs or improving existing drugs to be safer and more effective for use during pregnancy.

6. **Providing recommendations for health policies:**
- By providing recommendations based on research results, it is possible to influence the formulation of health policies related to the use of anticoagulant injections during pregnancy.
- This contributes to enhancing coordination between health care providers and policy makers to ensure the application of best medical practices.

7. **Supporting public health:**
- By improving the management of health conditions that require the use of anticoagulant injections.
- It contributes to promoting public health and reducing mortality and morbidity rates associated with blood clots during pregnancy.
- Enhancing the capacity of health systems to provide comprehensive and integrated care for pregnant women, which has a positive impact on society as a whole.

2. Study Hypotheses

Hypothesis 1: Providing clear recommendations to healthcare providers regarding the use of fluid injections during pregnancy, which enhances care coordination and improves health outcomes for mothers and children.

Hypothesis 2: Producing results that accurately explain the benefits and risks of using fluid injections, providing conclusive evidence on which medical decisions and health policies are based.

Hypothesis 3: Developing educational programs targeting pregnant women and their families, explaining the use of fluid injections and clarifying the benefits and risks in a simple and understandable manner.

Hypothesis 4: Preparing guidelines for best medical practices in the use of fluid injections during pregnancy, which helps achieve the highest levels of safety and effectiveness.

Hypothesis 5: Providing a decision-making framework that helps doctors and patients make informed decisions regarding the use of fluid injections, while clarifying the alternatives and potential risks.

Hypothesis 6: Identifying knowledge gaps and contributing to directing future medical research to achieve further progress in understanding the impact of fluid injections on pregnancy.

3. Previous studies

- Pharmacologic interventions play a major role in obstetric care throughout pregnancy, labor, delivery, and the postpartum period. Traditionally, obstetric providers have used standardized dosing regimens developed for nonobstetric indications based on pharmacokinetic knowledge from studies in men or nonpregnant women. With the recognition of pregnancy as a special pharmacokinetic group in the late 1990s, many of the fundamental physiologic changes that occur during pregnancy have a significant impact on drug absorption, distribution, and elimination. The activity of drug-metabolizing enzymes in the first and second trimesters is differentially altered by pregnancy, resulting in drug concentrations varying sufficiently for some drugs to have their efficacy or toxicity affected. Placental transporters play a key dynamic role in determining fetal drug exposure.

However, to truly improve pharmacologic care for our pregnant patients and their developing fetus, further research is urgently needed [1, 2].

- In a study by Yixiao Wang et al. in 2022, randomized controlled studies were conducted comparing aspirin for the prevention of PE, a pregnancy-specific disorder that affects about 3-5% of pregnant women worldwide. Systematic reviews were conducted according to the guidelines of the Cochrane Handbook. A fixed-effects model or a random-effects model was chosen to calculate pooled relative risks with 95% confidence intervals based on the heterogeneity of the included studies.
  The study aimed to investigate the effect of aspirin on the development of PE in a high-risk and general population of women. All included studies were assessed for bias by the Cochrane Handbook for the Assessment of Bias. Subgroup analyses were performed on aspirin dose, initial aspirin intervention time, and the region in which the research was conducted. To explore the effective dose of aspirin and initial aspirin intervention time and try to find the sources of heterogeneity. A total of 39 articles were included, including 29 studies involving pregnant women at risk of PE (20,133 patients) and 10 studies involving the general pregnant population (18,911 patients). Aspirin reduced the incidence of PE by 28% (RR 0.72, 95% CI 0.62-0.83) in women at risk of PE. Aspirin reduced the incidence of PE by 30% in the general population (RR 0.70, 95% CI 0.52-0.95), but sensitivity analyses found that aspirin in the general population was not as strong. A subgroup analysis showed that a dose of aspirin of 75 mg/day (RR 0.50, 95% CI 0.32-0.78) had a better protective effect than other doses. Starting aspirin at 12–16 weeks (RR 0.62, 95% CI 0.53–0.74) of gestation or 17–28 weeks (RR 0.62, 95% CI 0.44–0.89) reduced the incidence of PE by 38% in women at risk of PE, but results were more reliable for use at 12–16 weeks. The heterogeneity and bias in the publication of the included studies may be due mainly to studies completed in Asia. Aspirin is recommended to be started at 12–16 weeks of gestation in women at risk of PE. The optimal dose of aspirin for use is 75 mg/day.
- WANG, Yixiao, et al in 2024, sayed recurrent pregnancy loss (RPL) has a complex, multifactorial etiology, with unexplained recurrent pregnancy loss (U-RPL) occurring in about half of patients. Recently, low molecular weight heparin (LMWH) has gained attention for its therapeutic potential. They have had study aims to evaluate the efficacy of LMWH in early pregnancy regarding live birth rates (LBR) in U-RPL cases. And included registered randomized controlled trials (RCTs) and stratified results based on clinical factors such as the number of previous miscarriages, treatment type, and control type. The intervention involved LMWH alone or in combination with low-dose aspirin (LDA). Six studies with 1,016 patients were analyzed. The meta-analysis found no significant increase in LBR with LMWH in U-RPL, yielding a pooled odds ratio of 1.01 and moderate heterogeneity. Sub-analyses by country, treatment type, and control type also showed no significant effect of LMWH on LBR across all subgroups, with high heterogeneity. Overall, the findings indicate a non-significant effect of LMWH on LBR in U-RPL based on moderate quality evidence.

4. Field Study Results

A set of important questions was prepared to achieve the study objectives and take into account the study hypotheses. These questions were placed in a questionnaire to be distributed to the selected cases, and the questionnaire was formulated based on a binary Likert scale. The questions and answers were as follows:

1- Did you have health problems that required the use of blood thinners before pregnancy?

Table 1: Case responses to the First question

Phrases	Frequency	Percentage %
Yes	26	33
No	54	68

Through the cases the answers to the first question, it is clear that the answer was no, which was the highest at 68 percent; while on the contrary, the answer was yes, at 32 percent. In the case of a yes answer, a question was created to obtain an accurate answer, which is "How was your condition diagnosed before pregnancy?". The percentage of answers was as shown in the figure below.

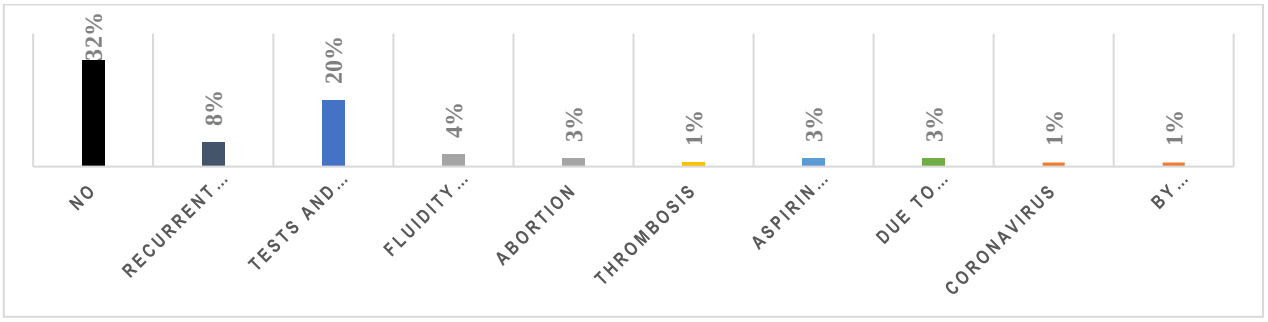

Fig 1: Various answers if yes

2- What anticoagulants did you use before pregnancy?

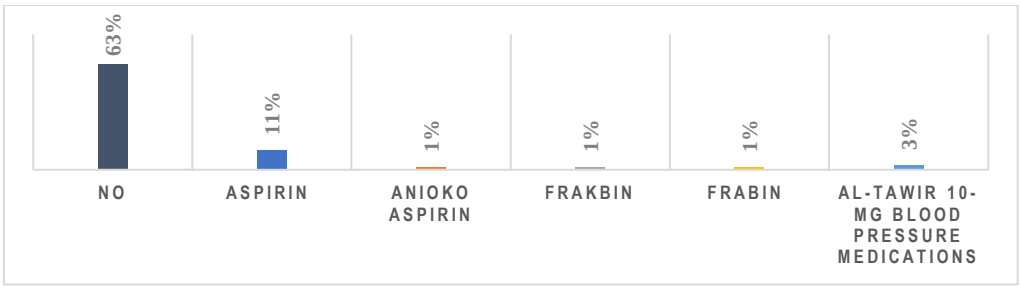

Fig 2: Anticoagulant medications you used before pregnancy

3- Have you taken anticoagulants during pregnancy?

Table 2: Case responses to the Third question

Phrases	Frequency	Percentage %
Yes	20	25
No	60	75

4- Have you noticed a negative or positive effect on pregnancy due to taking anticoagulants?

Table 3: Positive and negative responses to the presence of harms from using anticoagulant medications

Phrases	Frequency	Percentage %
Positive	20	25
Negative	60	75

5- Have you had any problems during pregnancy attributed to the use of anticoagulants?

Table 4: The answer to the presence of problems during pregnancy attributed to the use of anticoagulants

Phrases	Frequency	Percentage %
Yes	49	61
No	31	39

6- Did you consult your doctor before starting to take blood thinners during pregnancy?

Table 5: The answers to consulting a doctor before starting to take blood thinners during pregnancy

Phrases	Frequency	Percentage %
Before	31	39
During	28	35
None	21	26

7- Have you received any special instructions regarding the use of blood thinners during pregnancy?

Table 6: Answers to any special instructions regarding the use of blood thinners during pregnancy

Phrases	Frequency	Percentage %
Yes	56	70
No	24	30

8- Did your doctor give you any special advice about taking blood thinners during pregnancy?

Table 7: Answers to the doctor's advice about taking blood thinners during pregnancy

Phrases	Frequency	Percentage %
Yes	57	71
No	23	39

9- Was there any change in medication dosage or awareness during pregnancy?

Table 8: Answers if there is any change in the medication dosage or awareness during pregnancy

Phrases	Frequency	Percentage %
Yes	53	66
No	27	34

10- Were any additional procedures or tests used to monitor the health of the fetus due to the use of blood thinners?

Table 9: Answers Use of additional procedures or tests to monitor the health of the fetus due to the use of blood thinners

Phrases	Frequency	Percentage %
Yes	22	27
No	58	73

11- Was a blood test to measure the clotting factor (INR) level done regularly while using blood thinners during pregnancy?

Table 10: Answers if a blood test to measure the clotting factor (INR) regularly performed while using blood thinners during pregnancy

Phrases	Frequency	Percentage %
Yes	49	61
No	31	39

12- Was there any effect on the birth process as a result of using blood thinners?

Table 11: Answer to the effect of blood thinners on the birth process

Phrases	Frequency	Percentage %
Yes	69	86
No	11	14

13- Was there an increase in bleeding during pregnancy as a result of using blood thinners?

Table 12: Answer to the fact that using blood thinners leads to an increase in bleeding during pregnancy

Phrases	Frequency	Percentage %
Yes	67	84
No	13	16

14- Does miscarriage occur due to taking blood thinners during the first months of pregnancy?

Table 13: The presence of miscarriage in the first months of pregnancy using blood thinners

Phrases	Frequency	Percentage %
Yes	20	25
No	60	75

15- **Have you ever been prescribed blood thinners and not taken them?**

Table 14: The answer to Blood thinners were prescribed and not taken

Phrases	Frequency	Percentage %
Yes	10	12
No	70	88

16- Have you had any complications related to your kidneys and liver?

Table 14: The answer to Blood thinners were prescribed and not taken

Phrases	Frequency	Percentage %
Yes	15	19
No	65	81

5. Conclusion

The use of anticoagulants during pregnancy is a vital and complex topic that requires a careful balance between the potential benefits and potential risks to both mother and fetus. Anticoagulants play a fundamental role in preventing blood clots that can be life-threatening. However, the physiological

changes that occur in the pregnant woman's body, in addition to the potential effects of the drugs on fetal development, make this a sensitive issue.

Heparin and low molecular weight heparin are the most commonly used due to their relative safety, as they do not cross the placenta and therefore do not directly affect the fetus. This makes them the preferred choice for treating and preventing blood clots during pregnancy. Although warfarin is effective in preventing clots, its use is very limited due to the significant risks it can cause to the fetus, such as congenital malformations and bleeding. Newer oral anticoagulants, such as apixaban and rivaroxaban, are still under study to determine their safety during pregnancy, and at present, it is preferable to avoid their use except in cases of extreme necessity. Effects of anticoagulants on mother and fetus The main challenges of using anticoagulants during pregnancy include managing the dosage and timing of treatment to ensure efficacy and minimize risks. Anticoagulants can increase the risk of bleeding, both during pregnancy and during delivery, requiring careful monitoring and adjustments in treatment as needed. In addition, the effect of the drugs on the mother's health and fetal development must be considered, taking into account the natural changes that occur in the coagulation system in pregnant women.

In specific cases such as antiphospholipid syndrome, anticoagulants become essential to prevent serious complications such as recurrent miscarriage and blood clots. Here, close collaboration between obstetricians and gynecologists and vascular physicians becomes vital to ensure the best possible outcomes for mother and fetus. Continuous education of the mother about the potential risks and benefits of using anticoagulants during pregnancy is also required.

Birth planning is critical when using anticoagulants. The medical team should develop a detailed birth plan that takes into account the ideal timing for stopping anticoagulants before delivery to minimize the risk of bleeding, while ensuring that the mother is protected from the risk of thrombosis. This requires a delicate balance and constant coordination between doctors and healthcare professionals to ensure the safety of the mother and fetus.

Recommendations

For physicians and specialists:

- Careful assessment of the health status: A comprehensive assessment of the mother's health status should be performed before starting anticoagulant therapy. This includes reviewing the complete medical history and identifying any existing risk factors for blood clots.
- Selection of the appropriate drug: Low molecular weight heparin or regular heparin is preferred as the first choice for treating and preventing blood clots during pregnancy. Warfarin should be avoided as much as possible due to its harmful effects on the fetus.
- Regular monitoring: The condition of the mother and fetus should be monitored regularly, including blood tests to assess the effectiveness of the treatment and prevent bleeding. Doses should be adjusted based on the results to ensure safety and effectiveness.
- Coordination between physicians: Coordination should be done between obstetricians and gynecologists, vascular physicians, and anesthesiologists to ensure a comprehensive and integrated treatment plan. This coordination becomes even more important when planning childbirth.
- Birth planning: A detailed birth plan should be developed that includes timing of discontinuation of anticoagulants to reduce the risk of bleeding during childbirth. This plan should be discussed with the mother and all options and risks explained.

- Education and awareness: It is essential to educate pregnant women about the risks and benefits of using anticoagulants. Support and information should be provided to help them make informed decisions about their treatment.

For pregnant women:

- Continuous communication with the medical team: Pregnant women who are taking anticoagulants should stay in constant contact with their medical team and report any unusual symptoms such as bleeding or severe pain.
- Adherence to medical instructions: It is important to follow medical instructions carefully regarding dosages and medication schedules. Failure to adhere to them may increase the risk of blood clots or bleeding.
- Self-education: Pregnant women should read and understand information about anticoagulants and their effects on pregnancy. This can help reduce anxiety and increase understanding of the medical procedures required.
- Monitoring symptoms: Pregnant women should monitor any unusual signs or symptoms such as excessive bleeding, unusual pain, or swelling. If any of these symptoms occur, they should contact their doctor immediately.
- Diet and lifestyle: It is important to follow a healthy, balanced diet and an active lifestyle, while avoiding bad habits such as smoking. This can help promote general health and reduce the risk of blood clots.

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