**Von Willebrand’s Disease: how it affects expecting mothers with the disorder and the importance of knowing the specific diagnosis**

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**Von Willebrand’s Disease is an autosomal genetic bleeding disorder which has varying severity types. This can potentially cause problems for a female patient who is pregnant or in labor because of several factors involved in that process. However, a study done spanning patients across the nation discovered that more mothers with VWD experienced certain medical complications than mothers without the disorder. However, there are treatment options for VWD patients to alleviate symptoms such as excessive blood loss or fatigue caused by the blood loss such as Amicar and oral birth control pills for female patients. Even though there are a few available medications and treatment options for VWD patients, there is still plenty of research and work to be done on a more permanent solution, but informing your doctor of the diagnosis if pregnant is a step in the right direction for patients.**

**Introduction**

 Von Willebrand’s Disease is a blood disorder which causes deficient coagulation when injured or, in the case of a female patient, menstruating. This is due to the protein in the blood called the Von Willebrand Factor, or VWF, being either deficient or deformed. VWF carries the clotting Factor VIII, so if the former is not healthy, the latter will follow. Von Willebrand’s Disease, or VWD, includes three different types varying in severity. Type 1 is the mildest and is a quantitative deficiency in VWF. Type 3 is the most severe and involves the same type of deficiency, only to a much greater extent. However, Type 2 is a qualitative deficiency and contains four different possible subtypes (Castaman 2019). The subtypes include 2A, 2B, 2M, and 2N and each vary in either their platelet-dependency function or affinity for a specific clotting factor (Castaman 2019). Each type and subtype has its own specific multimer pattern that distinguishes it from the others, which is partly how the disorder is diagnosed.

This bleeding disorder, depending on the type, can negatively affect the patient’s daily life, especially for a female because of the frequency and volume of menstruation. Normal amounts of menstrual blood loss can be heavy, but with VWD, it is prolonged and heavy every month for the female patient because the clotting deficiency prevents it from stopping. In some cases, the first time can last for as long as a full month before it can clot enough to stop. Often VWD is diagnosed with iron-deficient anemia because the massive blood loss from clotting deficiencies. These combined can cause the patient to feel fatigued and weak, especially if they are active in sports or other types of exercise. For this reason, it can cause the patient to faint or black out when standing up too suddenly or even after standing up for a while, especially if she has not eaten very much. Furthermore, pregnancy and childbirth of a mother with VWD could possibly be dangerous despite VWF levels naturally rise during pregnancy (Castaman 2019).

**Recent Progress**

 James and Jamison created a study to determine just how dangerous labor and delivery can be for a woman with VWD. They observed medical conditions and complications in women with and without the disorder across the U.S. to determine the ratio of risk involved for VWD mothers compared to mothers without. It resulted in conclusions such as mothers with VWD were more likely to experience cardiomyopathy, a heart disease which hardens the muscle and makes it hard to pump blood throughout the body, with a 6.8 odd ratio and thrombocytopenia, which is a low platelet count with a 2.5 odd ratio (James and Jamison 2007). This means that VWD mothers are about 7 times more likely to have cardiomyopathy than healthy ones and 3 times more likely to have thrombocytopenia. In addition, they were 10 times more likely to have antepartum bleeding, but fortunately no more likely to experience preterm labor as the former is a risk factor for the latter (James and Jamison 2007). Hospital stays also tended to be slightly longer for mothers with VWD (James and Jamison 2007). On another note, there was no increased risk of fetal complications compared to a healthy mom (James and Jamison 2007).

Despite how bleak some of these results sound, there are treatments and medications available for VWD patients. While none are cures, they have the capacity to significantly increase the quality of life a patient has, depending on the diagnosis. These include desmopressin, aminocaproic acid, certain birth controls for menorrhagia, and replacement therapy for the more severe cases. Desmopressin, or DDAVP, is a synthetic version of the diuretic drug vasopressin, so it increases circulation including that of VWF and FVIII (Castaman 2019). Aminocaproic acid, or Amicar as it is marketed, is an antifibrinolytic which means it promotes clotting. Birth control pills specifically containing estrogen can also alleviate symptoms for women because it regulates the menstrual cycle, and in more severe menorrhagia, can be taken continuously to avoid menstruation completely, without placebos. Replacement therapy is a more invasive and direct approach, where concentrates of VWF and FVIII are directly infused into the patient to increase levels (Castaman 2019).

Another study to help make the process of diagnosing VWD more efficient and accurate, proved to be successful. Normally, the process is a “manual, labor‐intensive laboratory‐developed test requiring significant time and technical expertise” that has multiple steps and equipment needed (Crist, Heikal 2018). This study combined these steps and equipment into one machine and one step to determine multimer patterns in the blood (Crist, Heikal 2018). This new method is called the Sebia method, short for “Sebia Hydragel 5 von Willebrand Multimers method” which uses the “Sebia HYDRASYS 2 SCAN instrument” (Crist, Heikal 2018). “Plasma specimens from 24 patients being evaluated for VWD” were used to assess method accuracy utilizing the standard method as a control (Crist, Heikal 2018). The results were considered to be successful, meaning that all of the samples tested with the new method showed normal expected multimer patterns (Crist, Heikal 2018).

**Discussion**

 Crist and Heikal’s study that developed the new method for diagnosing Von Willebrand’s Disease is crucial for female patients because an efficient diagnosis allows the patient to begin treatment more quickly. The importance of accurately diagnosing the specific type or subtype a person has affects what type of treatment will help and their quality of life. Expecting mothers especially should know their diagnoses, as the information could potentially save their life during delivery.

A possible question for future research could look into what causes the natural rise in VWF in healthy mothers during pregnancy and if it can be replicated to help VWD patients. Since there's a natural rise in VWF during pregnancy in healthy women, we need to look at what causes that to happen to try and replicate or enhance it for VWD patients. If we can reproduce this natural increase in VWF in healthy moms, it could be used to help treat VWD patients, regardless if they are expecting a child or not. However, the first priority should be to use that innovation to prevent the previously mentioned complications for VWD mothers, as they would need it most.

Another question that should be asked is if these VWD mothers in James and Jamison’s study were knowledgeable about their specific diagnosis and type and informed their doctors to try and prevent certain complications. Since this information was not mentioned in the article, it can only be speculated that the specific types were not known. The patients might have known their type and subtype, but might not have thought it was important enough to inform the doctor. Or the doctor was informed, and the researchers simply did not incorporate the type data into their study when they should have. As mentioned above, expecting mothers with VWD should take precautions such as knowing what type they have and informing their delivering doctor of the diagnosis so that they can monitor it and attempt to ensure that childbirth is safe and healthy for the mother and baby. It would also be a good idea to have the child tested for the disease, as it is an inherited disorder.

Lastly, there needs to be studies done to figure out how to repair the shape or form of type 2 patients for a long term solution that does not need constant treatment. There are different treatment options for type 1 and type 3 patients, and still there is a risk of treatment being less effective for type 3 patients. However, for type 2 patients, there is not a treatment that creates a solution to their specific problem because unlike the other types that have insufficient numbers of VWF, type 2 VWF is deformed so the current treatment options are not a definitive solution.

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