

## 78. Sticky Platelet Syndrome

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**Q1: "What is the "sticky platelet syndrome"? Some people say they have it and it caused their clot and they are on aspirin because of it. Can anyone shed any light?"**

A1: Some patients with blood clots have been found on laboratory testing to have "sticky platelets" and it has been thought that these "sticky platelets" may have caused the blood clots. At present, there are no scientific data that show that "sticky platelets" increase the risk for blood clots or that a clinically relevant "sticky platelet syndrome" really exists.

When we injure ourselves and bleed, our body responds by forming a blood clot at the site of the blood vessel injury to stop the bleeding. The first part of the clot formation is that blood platelets (= thrombocytes), which are little particles in the blood stream, clog up the hole where we are bleeding. Platelets do that by sticking together and forming a platelet plug (= platelet aggregate). The plug is then strengthened by our clotting factors, which form a meshwork around the platelets. The meshwork consists of the clotting protein fibrin.

For platelets to become sticky and form a plug, they need to be activated by certain blood and tissue chemicals, which are only active at the site of injury. This leads to clot formation only at the site of injury, and not at unwanted other sites where no injury has occurred. Some individuals have platelets that can be activated (and made "sticky") by much lower concentrations of these chemicals than the platelets of most people. This is referred to as the "sticky platelet syndrome". A synonym is "platelet hyperaggregability". A diagnosis of "sticky platelet syndrome" is made in the laboratory with the so-called "platelet aggregation study": blood is drawn from a patient and platelet -activators (called ADP and Epinephrine) in different concentrations are then added to the test tube; the extent of clot formation (= platelet aggregation) is then measured. If platelets clot at low concentrations of ADP and Epinephrine, they are said to show "hyperaggregability". Depending on (a) how exactly a laboratory defines what a "low concentration" of the platelet -activators ADP and Epinephrine is and (b) what is defined as an abnormal result, quite a few healthy people may have platelet hyperaggregability or "sticky platelets".

The term "sticky platelet syndrome" first appears to have been used at a medical conference in 1983 (9th International Conference on Stroke and Cerebral Circulation; Phoenix, AZ), where 10 young patients with stroke were reported who had "sticky platelet syndrome". The term first appeared in the printed medical literature in 1988 (ref. 1). Some published data indicate that the "sticky platelet syndrome" may run in families and be inherited. However, it is not known what really causes the "sticky platelet syndrome" and no genetic abnormality has been detected in patients with this syndrome.

Unfortunately, hardly any good clinical studies have been performed and published looking at the "sticky platelet syndrome" and assessing whether it is really a risk factor for blood clots, either arterial clots (heart attacks, TIA, stroke), venous clots (DVT and PE), or recurrent pregnancy loss. All clinical publications are single case reports or reports of the experience of a single investigator (case series) (ref 1,2,3,4), which are, by their nature, the most simple of clinical publications. They are typically not useful in understanding a disorder or shedding light on the clinical significance of the disorder. They are, again, due to their nature, biased, and do not allow any generalization regarding the disorder. They do not even prove a relationship between the disorder ("sticky platelets") and a clinical problem (blood clots). Review articles summarizing the previous limited-quality publications of "sticky platelet syndrome" do not enhance the knowledge of the significance of platelet hyperaggregability any further, but have been written in abundance (ref 5,6,7,8). Interestingly, a recent study, methodologically fairly good, but too small, did not confirm that "sticky platelet syndrome" (as defined by previous authors) is a risk factor for venous blood clots (ref 9).

Due to the lack of studies clarifying whether "sticky platelets" really increase the risk for blood clots or whether they are clinically important, many laboratories and clinicians do not test for "sticky platelets". The author of the original and most other "sticky platelet" publications, Dr. Mammen, practiced at Wayne State University in Detroit, Michigan; Dr. Bick, the author of other articles, practices in Dallas. Many of the patients in the U.S. who carry the diagnosis of "sticky platelet syndrome", therefore, live in or have some association with the Detroit or Dallas area.

Serious and good quality research and publications on platelet hyperaggregability are needed. First, the performance of the "platelet hyperaggregability test" needs to be investigated and defined and the occurrence of platelet

hyperaggregability in healthy individuals and, later, in patients with various disorders studied. Then, epidemiological association studies need to be done. And finally, randomized and blinded intervention studies (use of aspirin and other medications versus placebo) need to be performed to determine whether treatment of patients with hyperaggregable platelets makes a difference in clinical outcomes. A step in the direction of good studies on this topic was the recent publication of an investigation of "platelet hyperaggregability" in healthy individuals (ref 10).

**Personal Comment:** It is likely that platelet abnormalities exist (such as genetic variations of the platelet surface receptors) that make platelets "more sticky" and increase a patient's risk for blood clots. Likely, this increased risk refers mostly to clot formation in arteries (heart attacks, TIA, stroke), since platelets play a major role in arterial clot formation. Such abnormalities may play only a minor role in blood clot formation in veins, since platelets do not appear to play a major role in vein clots. However, due to a lack of good clinical studies there is, at present, insufficient knowledge as to what the significance of "sticky platelets" is. Therefore, I do not routinely do platelet aggregation studies in patients with blood clots.

#### References:

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