

PFOs and Migraine—What is the Link?

A PFO is an opening in the heart that allows some blood from the right side of the heart to bypass the lungs at least sometimes to go directly to the whole body (general circulation). It may be slightly more frequent in migraineurs than the population as a whole, but it appears to be considerably more frequent in migraineurs with aura than without aura. In recent years some patients reported that after closure of their PFO surgically for specific health reasons, their migraines also were reduced in frequency or intensity, and in some patients their migraines stopped completely. Studies are underway to confirm these observations.

PFO is an abbreviation for patent foramen ovale, which is a small opening in the wall of the upper chambers of the heart that connects the right and left side called atria. In most people (approximately 80%), this opening closes on its own shortly after birth. However, in a small group of patients, this tunnel between the right and left atria remains open allowing blood to pass between the chambers avoiding lung filtration. This is most likely to occur with increases in chest pressure from breath holding known as Valsalva maneuver. PFO appears to occur in between 40-49% with migraine with aura and 20-25% with migraine without aura.

In developing fetuses, the opening between the atria allow the blood to efficiently bypass the lungs and go into the general circulation because the mother is providing all the oxygen for the baby's circulation. Once the baby is born, this hole normally closes naturally allowing all the blood to go to the lung for oxygenation and filtration thereby closing this path allowing unoxygenated blood and other blood products to enter the general circulation.

In adults, PFO is associated with some risks such as decompression illness in divers and increased risk of stroke in individuals not normally at significantly risk for stroke. Because of such risks, the PFO can be repaired (closed) to reduce the risk of stroke. While still controversial and under study, many believe closing the PFO surgically may be warranted anticipating the benefits outweighs the risks. Closure is accomplished by using a catheter (that is inserted into the vein in the right groin) to place a device (there are several available commercially) that will close the hole in the heart. However, controversy persists on in the debate associated with the risk versus benefit in closing the PFO in patients with migraine.

The hypothetical mechanism thought to underlie a rationale for PFO closure in patients with migraine is that blood bypasses the lung containing substances ordinarily filtered by the lung. Alternatively, this blood also may contain very small particles (debris known as microemboli) that may adversely affect the brain, especially of susceptible individuals, such as migraineurs. The hope, therefore, is that by restoring the "normal" anatomy found in 80% of the population, the risk for migraine and stroke will be reduced. However, these studies are underway to confirm or deny this hypothesis.

To date, there is one completed clinical trial, which is referred to as the MIST-1 trial, where the primary objective of the study was not met. This study's primary objective was the complete elimination of migraine in a group of migraine patients who had their PFO repaired (closure group) over the sham group (individuals without device placement who otherwise had everything done the closure group had performed). The study did reveal however that 42% of the patients receiving closure had a 50% reduction in the number of headache days, which was significantly greater than the sham group. The difference between the two groups is similar to that achieved in most effective headache preventative drug trials.

Based on the mixed findings of this trial, and the initial anecdotal reports, some migraine patients are having their PFO closed. The reports however, have been observational and many consider this procedure premature because additional blinded prospective studies are needed to verify these early reports. At this time, at least three clinical studies are underway to further assess the effect of PFO closure on migraine. The editors believe that, with rare exception, PFO closure research must take place within trials so that the closure validity can be verified or rejected as a meaningful and safe approach to migraine prevention.