

PFO Closure Debate: Why All The Hype?

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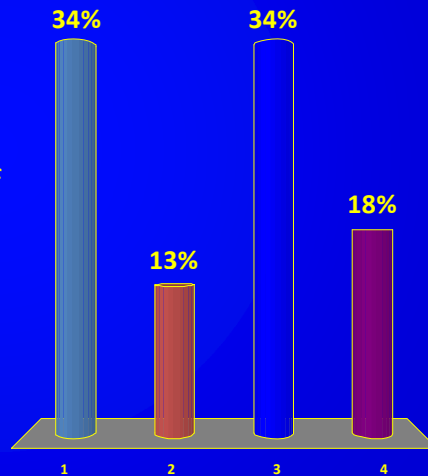
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Case Presentation

46-year old female is admitted with the abrupt onset of right arm weakness. Evaluation including an MRI demonstrates an area of acute ischemia in the brain. Other imaging studies of the carotid arteries are unremarkable. A transthoracic echocardiogram is ordered and demonstrates evidence for right to left shunting after 3 beats following the release of the Valsalva maneuver, consistent with a patent foramen ovale.

What would you do now?

1. Order a transesophageal echocardiogram.
2. Start patient on ASA 325 mg PO daily
3. Start warfarin to an INR of 2 - 3
4. Consultation with Dr. Chambers to consider percutaneous PFO closure.



Case Presentation

Hopefully after this talk you will:

- realize that there is probably no “right” answer
- you matter what option you choose, there will be controversy

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So let’s look at some of the controversy....

PFO Closure – the Con

- With all things (and because I like Dr. Chambers), I will grant my opponent the following points:

PFO Closure – the Con

- With all things (and because I like Dr. Chambers), I will grant the concede the following points:
 - In patients presenting with cryptogenic stroke, there is an increased incidence of patent foramen ovale and atrial septal aneurysms

PFO Closure – the Con

- With all things (and because I like Dr. Chambers), I will grant the concede the following points:
 - In patients presenting with cryptogenic stroke, there is an increased incidence of patent foramen ovale and atrial septal aneurysms
 - There are some instances where percutaneous PFO closure may be indicated

PFO Closure – the Con

- So What Are The Issues?

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 - Medical therapy is effective in reducing the risk of recurrent neurologic events

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- So What Are The Issues?
 - Population-based studies do not show a correlation between PFOs and neurologic events.
 - Medical therapy is effective in reducing the risk of recurrent neurologic events
 - Closure of PFOs are not completely effective
 - Recurrent shunts
 - Complications

PFO Closure – the Con

- So What Are The Issues?
 - Most importantly, what is the hard evidence directly comparing medical therapy with PFO closure?

PFO Closure – the Con

- Population-Based Studies
 - The prevalence of patent foramen ovale in the general population
 - Consistently around 25%
 - Yet incidence of TIA/CVA is nowhere near 25% in the general population

PFO Closure – the Con

- In fact, in the SPARC study:
 - Over a median of 61 months of follow-up, the presence of a patent foramen ovale was not found to be independently associated with an increased risk for cerebrovascular events

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 - Over a median of 61 months of follow-up, the presence of a patent foramen ovale was not found to be independently associated with an increased risk for cerebrovascular events
- In the Northern Manhattan Study, over a follow-up of 80 months, PFOs were not independently associated with neurologic events

PFO Closure – The Con

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- Incidental PFO was not associated with increased perioperative morbidity or mortality

PFO Closure – The Con

- A Cleveland Clinic study looked at the closure of incidentally discovered patent foramen ovale at the time of cardiac surgery
- Incidental PFO was not associated with increased perioperative morbidity or mortality
- In fact, closure was associated with a 2.47-times greater odds of a postoperative CVA

PFO Closure – The Con

- Treatment with medication is effective
- In a recent meta-analysis of 15 studies looking at medical therapy, patients with a PFO and previous neurologic event on medical therapy have the same risk of recurrent neurologic events as patients without PFOs

PFO Closure – The Con

- With regard to medical therapy,
 - It appears that aspirin and warfarin have similar efficacy in most patients

PFO Closure – The Con

- Does closure prevent recurrent events?
 - Surgical closure
 - Annual recurrence rate for CVA = 0.34%
 - Annual recurrence rate for CVA/death = 0.85%

PFO Closure – The Con

- Well how about percutaneous closure?
 - Pooled analysis (prior to 2004)
 - Combined rate of recurrent stroke, death, or TIA = 2.95 events per 100 person-years
 - Combined rate for medical therapy = 4.0 events per 100 person-years

PFO Closure – The Con

- But they have better techniques and devices now....
 - However, in a transcranial Doppler study from Seattle in 2009 showed
 - 20% of patients had residual right to left shunting during balloon occlusion during PFO closure
 - 44% of patients who did not initially demonstrate right to left shunting showed right to left shunting during late follow-up

PFO Closure – The Con

- Percutaneous PFO closure has a defined complication rate
 - 1.5% rate of death, major hemorrhage, tamponade, or pulmonary emboli
 - Increased late risk of atrial fibrillation

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 - 1.5% rate of death, major hemorrhage, tamponade, or pulmonary emboli
 - Increased late risk of atrial fibrillation
- Most recent data demonstrates a mean frequency of major complications of 2.3%

PFO Closure – The Con

- Despite this, PFO Closure has to be more effective...
- What is the evidence against medical therapy?

PFO Closure – The Con

- Direct comparison of PFO closure against medical therapy
- Very little data....

PFO Closure – The Con

- CLOSURE I
 - The only randomized controlled trial to date that has been completed and published

PFO Closure – The Con

- CLOSURE I
 - 447 patients who underwent closure with STARFlex closure device
 - Treated with Plavix for 6 months and ASA for 2 years

PFO Closure – The Con

- CLOSURE I
 - 447 patients who underwent closure with STARFlex closure device
 - Treated with Plavix for 6 months and ASA for 2 years
 - 462 patients treated medically
 - Either ASA or warfarin
 - Again no difference in outcomes between ASA and warfarin

PFO Closure – The Con

- CLOSURE I
 - Primary outcome
 - Recurrent CVA/TIA within 2 years
 - All-cause mortality within 30 days
 - Neurological mortality 31 days to 2 years

PFO Closure – The Con

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 - Primary outcome
 - Recurrent CVA/TIA within 2 years
 - All-cause mortality within 30 days
 - Neurological mortality 31 days to 2 years
 - Secondary outcomes
 - Number of CVAs
 - Number of TIAs

PFO Closure – The Con

- CLOSURE I
 - Primary outcome data
 - 5.9% in PFO closure group
 - 7.7% in medical therapy group
 - P-value = 0.30

PFO Closure – The Con

- CLOSURE I
 - Secondary outcome data
 - CVA – 12 vs. 13
 - TIA – 13 vs. 17

PFO Closure – The Con

- CLOSURE I
 - Complication rates
 - Major vascular complications – 3.2% vs. 0%

PFO Closure – The Con

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PFO Closure – The Con

- CLOSURE I
 - Complication rates
 - Major vascular complications – 3.2% vs. 0%
 - Atrial fibrillation – 5.7% vs. 0.7%
 - Major bleeding – 2.6% vs. 1.1%
 - Interesting as this is frequently a rationale used for PFO closure (to avoid long-term anticoagulation)

PFO Closure – The Con

- Conclusions
 - The finding of a PFO is common and in the general population, IS NOT associated with an increased risk of a neurological event

PFO Closure – The Con

- Conclusions
 - The finding of a PFO is common and in the general population, IS NOT associated with an increased risk of a neurological event
 - Medical therapy is effective
 - Warfarin and ASA are equally efficacious

PFO Closure – The Con

- Conclusions
 - Closure of a PFO (either surgically or percutaneously) does not eliminate the risk of recurrent neurological events
 - In fact, risk of recurrent event after closure is similar to the rate of recurrent events with medical therapy

PFO Closure – The Con

- Conclusions
 - Closure of a PFO (either surgically or percutaneously) does not eliminate the risk of recurrent neurological events
 - In fact, risk of recurrent event after closure is similar to the rate of recurrent events with medical therapy
 - Closure of PFOs has risk associated with the procedure

PFO Closure – The Con

- Biggest Problem
 - No data to suggest it is more efficacious than medical therapy

PFO Closure – The Con

- Biggest Problem
 - No data to suggest it is more efficacious than medical therapy
 - Only randomized trial published to date – CLOSURE I
 - Did not show benefit of percutaneous closure over medical therapy

