

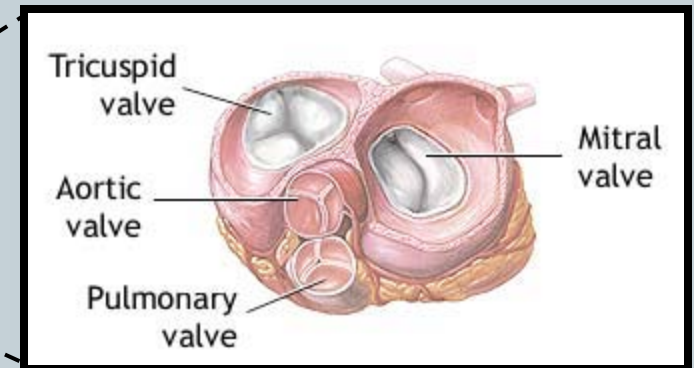
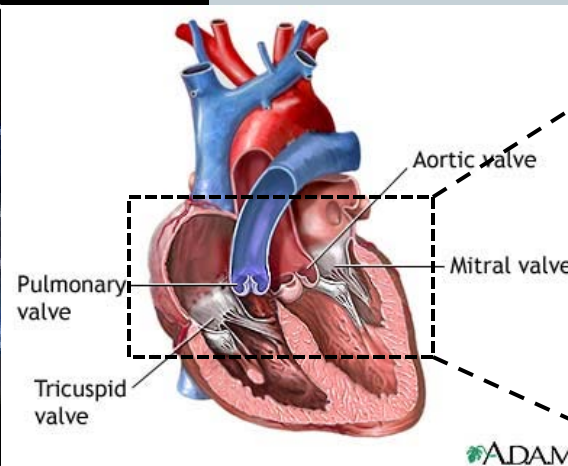
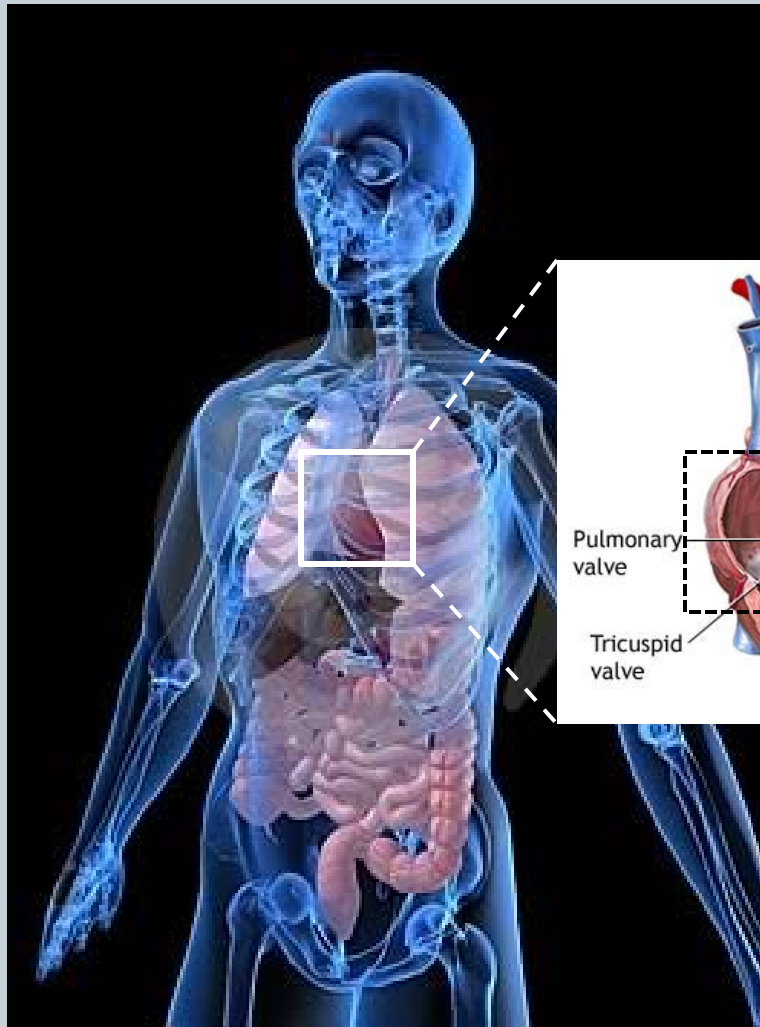
Study of Shear Induced Blood Damage in a Bileaflet Mechanical Heart Valve



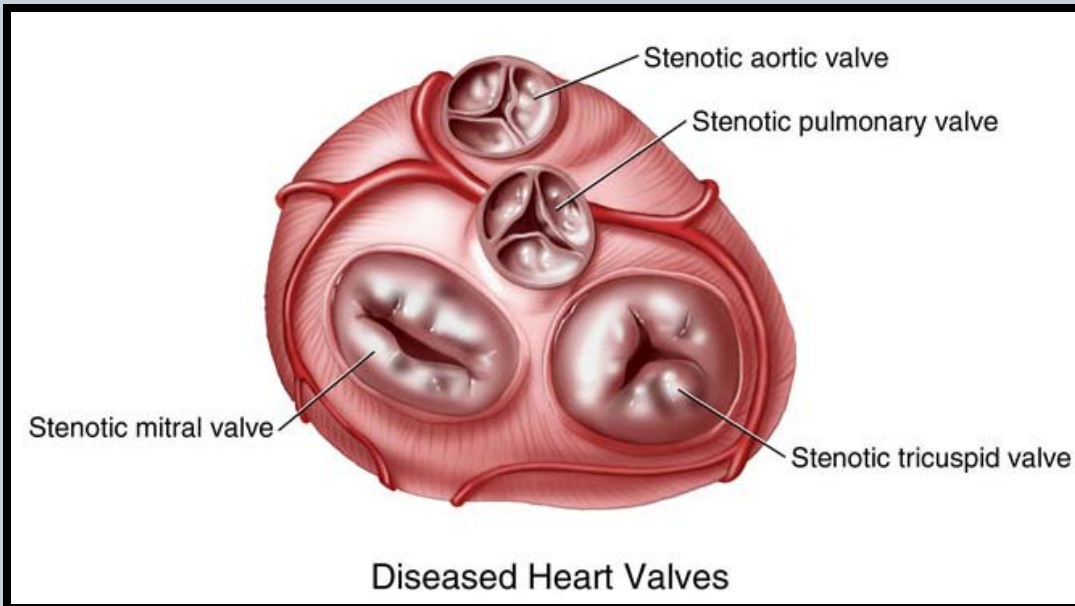
**SAHAJA BANDARI
DR. AJIT YOGANATHAN
CARDIOVASCULAR FLUID MECHANICS LAB**



Heart Valves

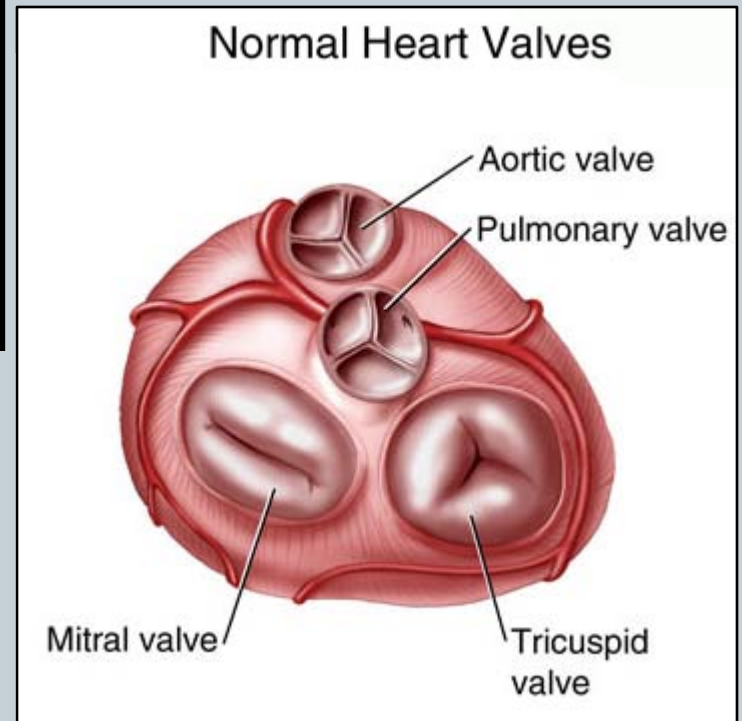


Why Care?



**“Diseased valves annually
account for 20,000 deaths
in the US alone”**

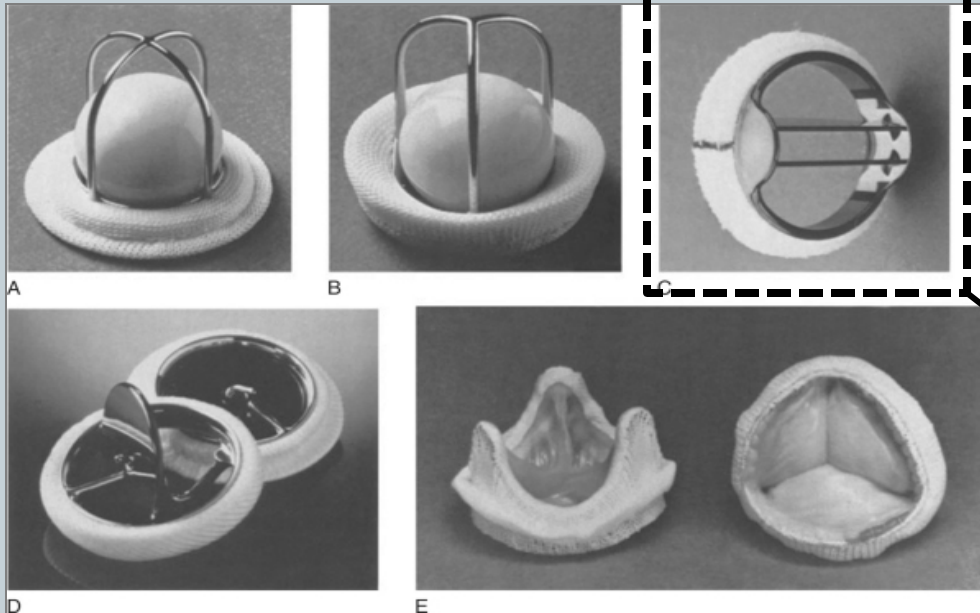
(Thom, 2006)



Is it treatable?



Prosthetic Heart Valves!



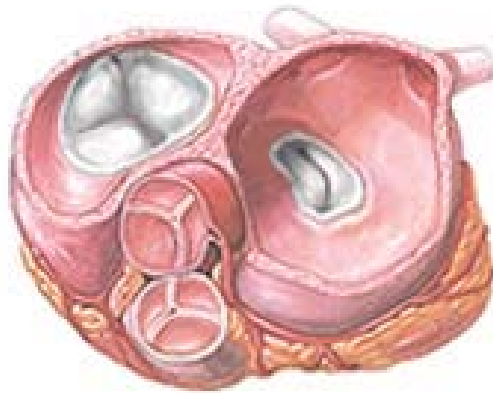
**Bi-leaflet
Mechanical
Heart Valve
(BHMV)**

- **Mechanical**
- Bio-prosthetic
 - (from human or pig valves)

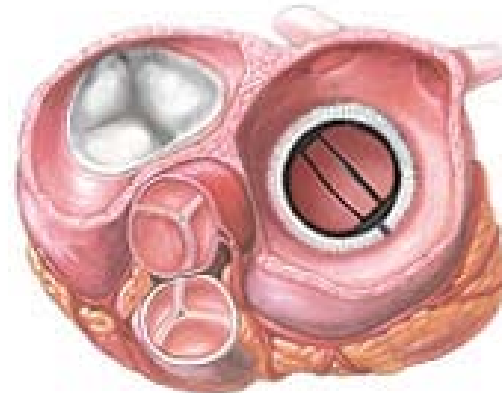
Before and After



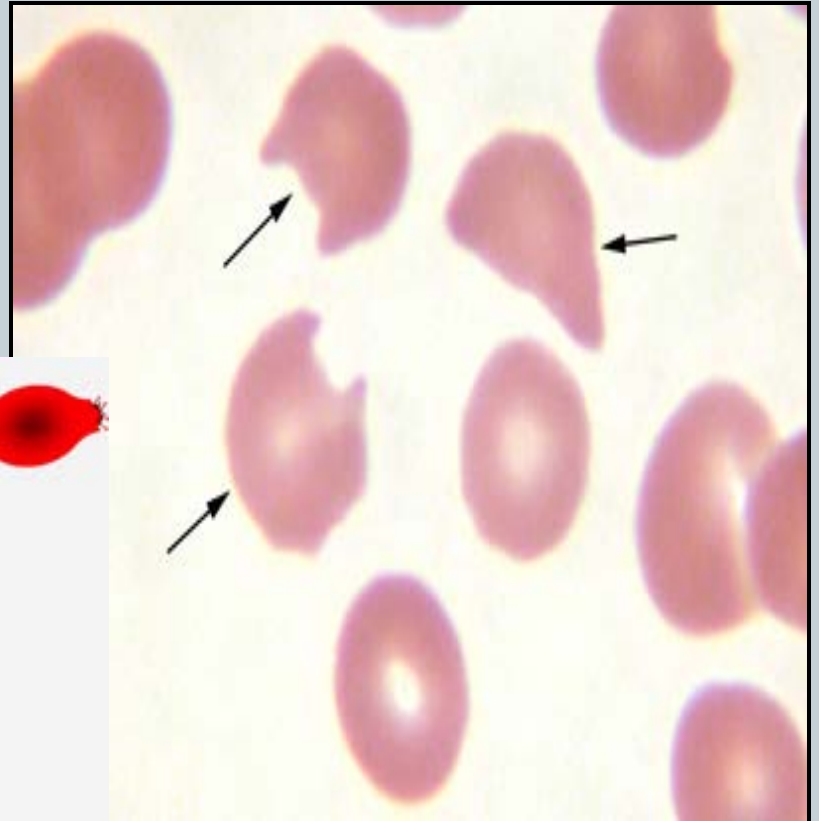
Before



After

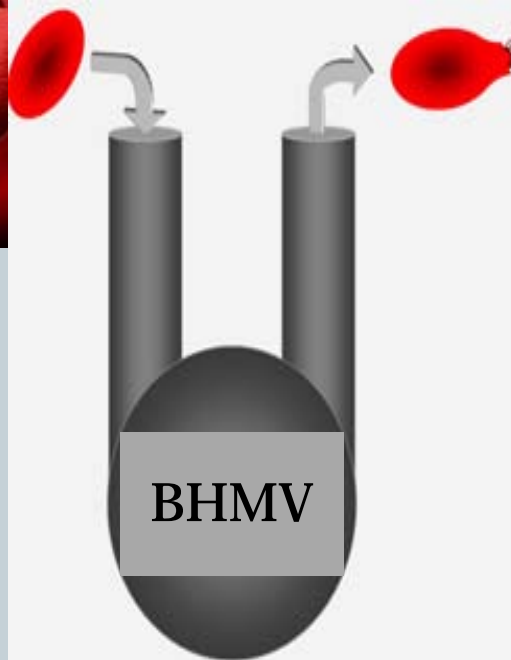


What's the catch?



RISK # 1

- Hemolysis

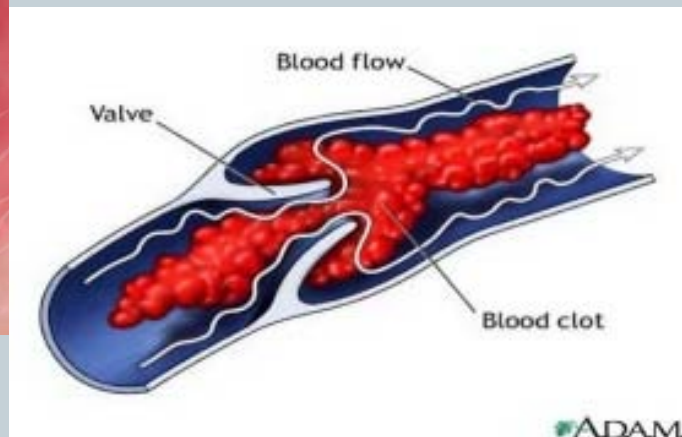
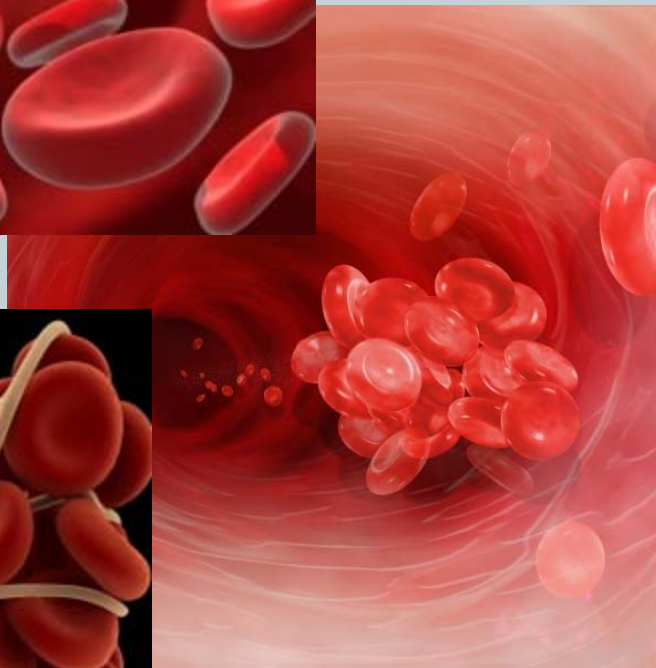
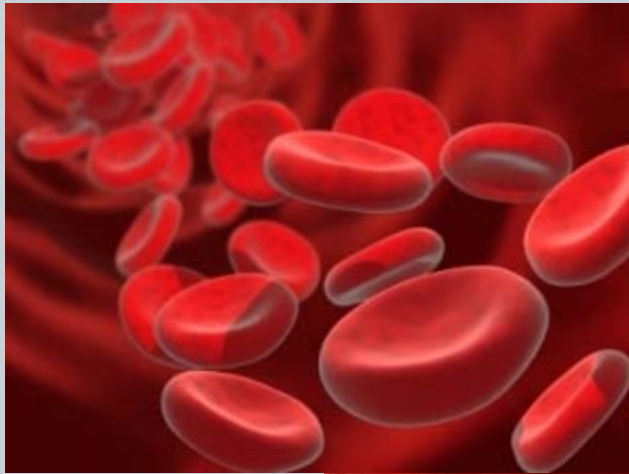


What's the catch?



OTHER RISKS

- **Thromboembolic Complications**
 - Coagulation
 - Platelet Activation
 - Anti-coagulation therapy
 - Hemorrhage



Why does this happen?



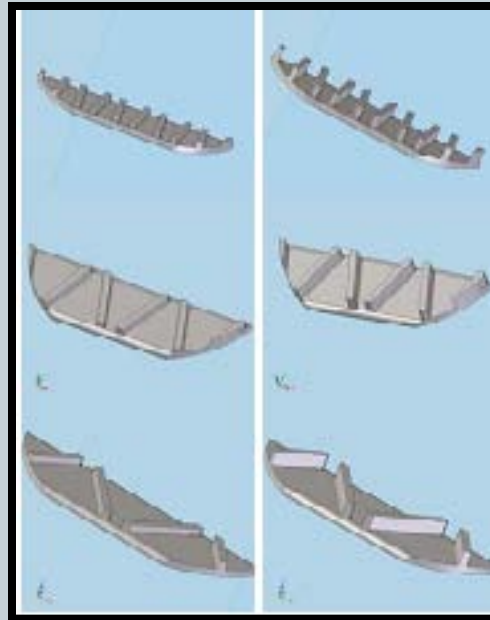
Excessive Shear Stress on the blood elements leads to
Hemolysis, Platelet Activation and Thromboembolic complications.

Experimental Design



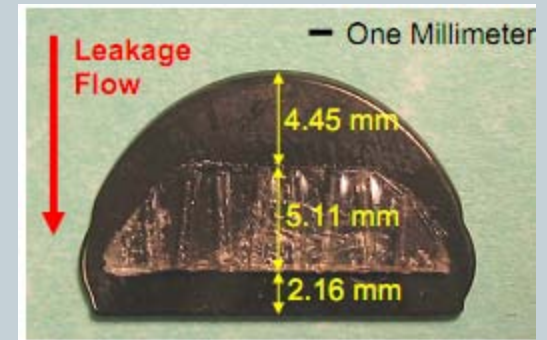
BHMV

+



Vortex
Generators

=



**Reduction of
Shear Stress**



**Reduction of
Blood
damage!**

Questions?



THANKS TO

