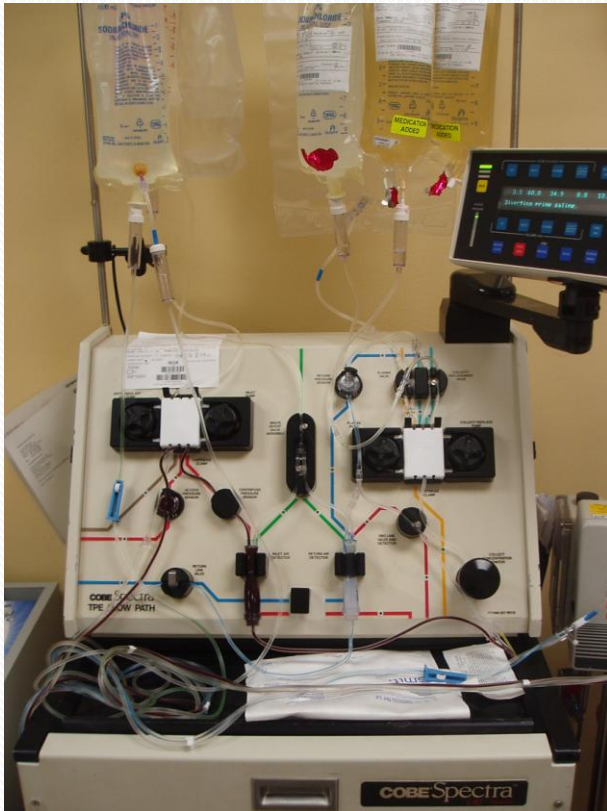


# Routine Coagulation Results Do Not Correlate with Pre-procedure Fibrinogen in Patients Receiving Plasma Exchange with Albumin Replacement Fluid

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# Plasma Exchange (PEX) & Bleeding Risk



- $\leq 78\%$  of clotting factors loss with 1.5 plasma volume exchange with albumin
- Serial PEX without FFP replacement could result in sustained low level of clotting factors
- Bleeding risk associated with PEX: Unknown

[Fibrinogen] of 200 mg/dL  $\xrightarrow[\text{1.5v Exchange}]{\text{PEX}}$  [Fibrinogen] ~ 44 mg/dL ( $\downarrow 78\%$ )  
**Hypofibrinogenemia**

# Preprocedure Evaluation of Clotting Factors

- Routine coagulation tests (e.g. prothrombin time):
  1. Currently used evaluate clotting factor level in patients prior to PEX
  2. May not reflect level of large clotting factors with longer half-lives & delayed recovery
- Congenital or acquired hypofibrinogenemia:  
Associated with increased bleeding risk
- Pre-procedure fibrinogen test: NOT current standard of practice



## Question:

Could routine coagulation screening test (e.g. PT) accurately estimate pre-procedure fibrinogen level?

# Demographic

<b>Study Cohort</b>	Retrospective
<b>Patients</b>	40
<b>Gender</b>	
Male	18
Female	22
<b># of PEX</b>	
Range	1 - 8
Median	5
<b>Data sets</b>	200

## Inclusion criteria

All available pre-procedure PT and fibrinogen test results from patients receiving PEX with albumin recorded at BJH Pheresis center

## Exclusion criteria

All data sets in patients receiving warfarin (↑ PT)

# Disease States

## Neurologic (n=27)

Myasthenia gravis	11
Multiple sclerosis/NMO	8
Guillain-Barré syndrome	3
Transverse myelitis	2
Others	3

## Transplant Rejection (n=7)

Heart	5
Lung	2

## Hematologic (n=4)

Waldenstrom's	2
Hyperviscosity Syndrome	1
ITP	1

## Others(n=2)

FSGS	1
PSC	1

# Methods

- Pre-procedure Prothrombin Time (PT)  
Conventional cutoff \*: **>19 seconds or INR 1.5**
- Pre-procedure Fibrinogen  
Cutoff: **≤ 200mg/dL**

*\*Medical decision making point on using FFP*

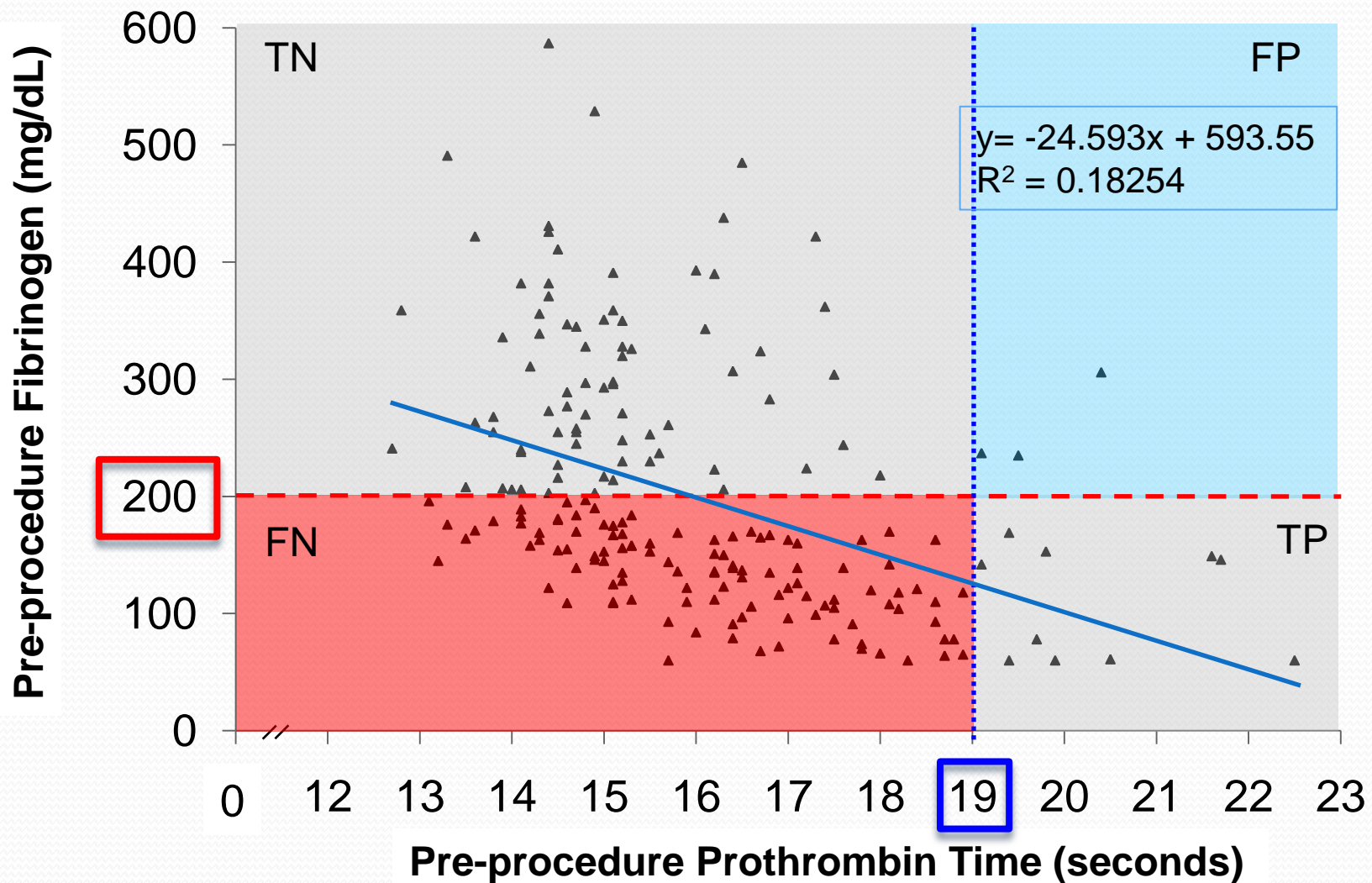
- Analysis  
Correlation between pre-procedure fibrinogen and PT
  - ❖ Linear regression analysis
  - ❖ ROC curve analysis

# Results:

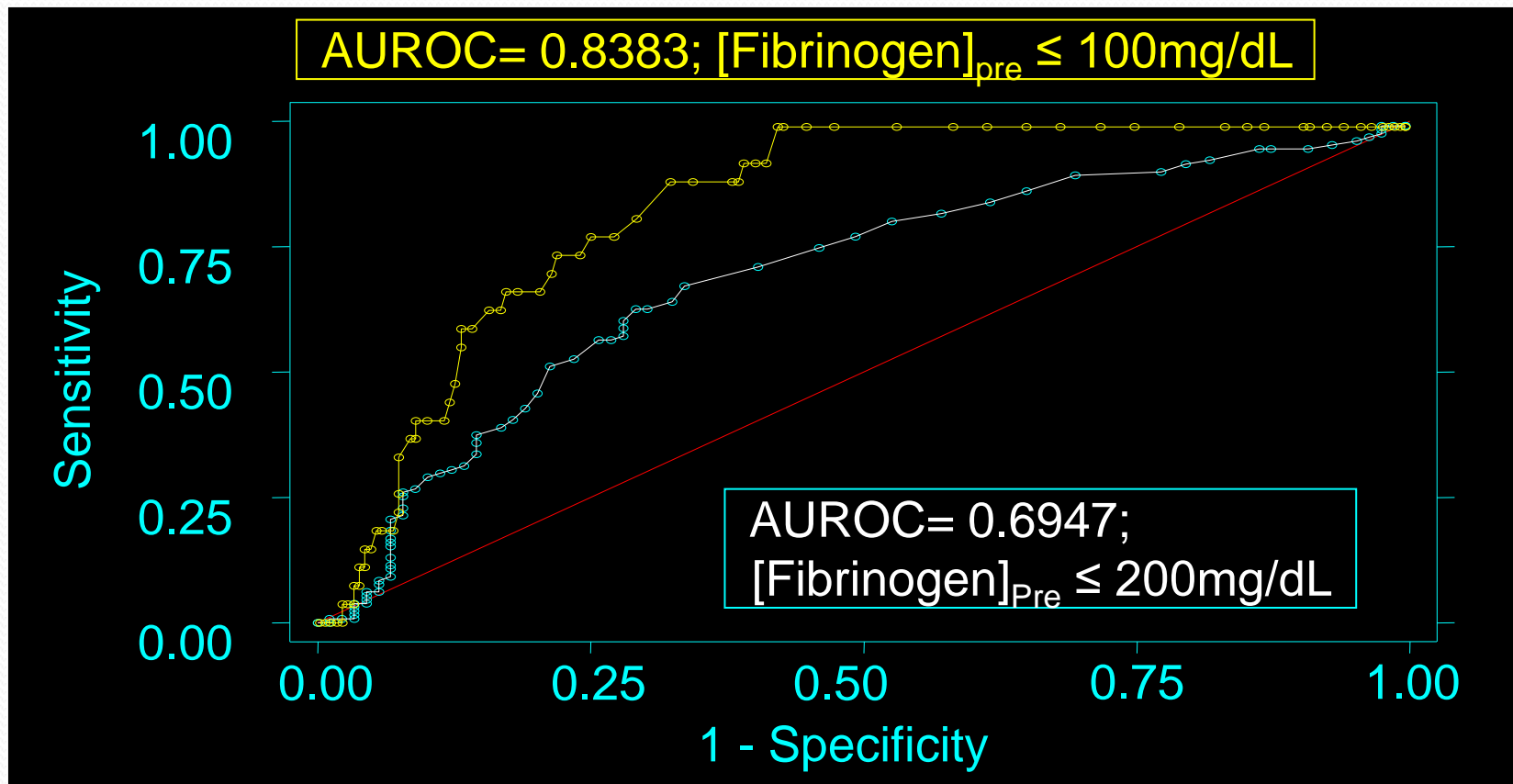
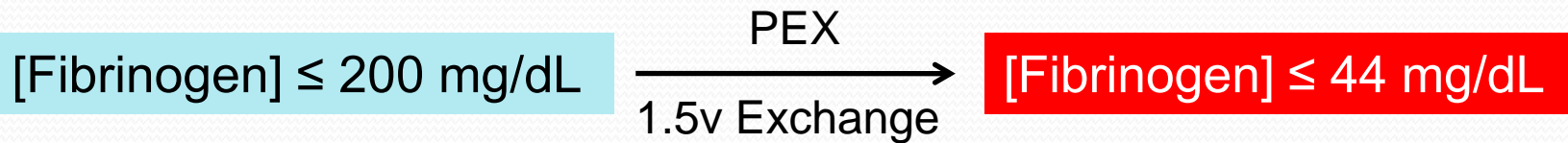
<b>Pre-procedure Test</b>	<b>Results (Median)</b>
Fibrinogen	169 mg/dL
Prothrombin Time	15.5 seconds

<b>Pre-procedure Tests Cutoffs</b>	<b>% of Results</b>
[Fibrinogen] $\leq 200$ mg/dL	60.5%
Prothrombin Time <19 sec	93.5%

# Relationship between $[\text{Fibrinogen}]_{\text{pre}}$ & $\text{PT}_{\text{pre}}$



# ROC Curve Analysis: Predictive Performance of PT



# Conclusions

- ✓ Routine pre-procedure coagulation tests (e.g. PT) are **not** robust sensitive tests to identify patients with pre-procedure fibrinogen  $\leq 200$  mg/dL
- ✓ If clinicians pursue identification of patients with pre-procedure fibrinogen level  $\leq 200$  mg/dL, then we recommend direct measurement of fibrinogen levels
- ✓ In patients who are at increased risk of bleeding, clinicians have several options available to minimize pheresis related hypofibrinogenemia, including:
  - A modified regimen (e.g. reduced exchange volume and/or longer time intervals between procedures)
  - The use of FFP/cryoprecipitate in patients with life-threatening conditions

# Acknowledgement

- Yanzheng Zhang, M.D.
- Marian S. Dynis, BSN, MHA
- Michaela A. Dino, APRN, BC-FNP
- Charles S. Eby, M.D.
- George J. Despotis, M.D.



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