function Delay = DetermineDelayTherapy(Tcheck,MeasuredThrombin)

%first, look for the first data point below half of the thrombin peak

[MaxThrombin,MaxThrombinIndex] = max(MeasuredThrombin);

TimeMaxThrombin = Tcheck(MaxThrombinIndex);

SlopeUpperValueIndex = find(MeasuredThrombin<=0.5\*MaxThrombin & Tcheck<=TimeMaxThrombin,1,'last');

SlopeUpperValue = MeasuredThrombin(SlopeUpperValueIndex);

SlopeUpperTime = Tcheck(SlopeUpperValueIndex);

%calculate the slope with the next lower data point

SlopeLowerValue = MeasuredThrombin(SlopeUpperValueIndex-1);

SlopeLowerTime = Tcheck(SlopeUpperValueIndex-1);

Slope = (SlopeUpperValue - SlopeLowerValue)/(SlopeUpperTime-SlopeLowerTime);

%calculate the x-intercept

b = SlopeLowerValue-Slope\*SlopeLowerTime;

xintercept = -b/Slope;

if xintercept > 0

EstimatedThrombinAtIntercept = interp1(Tcheck,MeasuredThrombin,xintercept);

%calculate parameters for perpendicalar through this x-intercept

SlopePerp = -1/Slope;

bPerp = -SlopePerp\*xintercept;

%find a pair of points backwards from the x-intercept that lie on either

%side of this perpendicular

found = 0;

CurrentIndex = find(MeasuredThrombin<=EstimatedThrombinAtIntercept & Tcheck<=TimeMaxThrombin,1,'last');

while found == 0

CurrentThrombinValue=MeasuredThrombin(CurrentIndex);

CurrentPerpThrombinValue = SlopePerp\*Tcheck(CurrentIndex)+bPerp;

if CurrentIndex > 1

NextThrombinValue = MeasuredThrombin(CurrentIndex-1);

NextPerpThrombinValue = SlopePerp\*Tcheck(CurrentIndex-1)+bPerp;

if(CurrentThrombinValue <= CurrentPerpThrombinValue && NextThrombinValue < NextPerpThrombinValue)

found = 1;

Delay = Tcheck(CurrentIndex);

elseif (CurrentThrombinValue >= CurrentPerpThrombinValue && NextThrombinValue < NextPerpThrombinValue)

found = 1;

Delay = Tcheck(CurrentIndex-1);

else

CurrentIndex = CurrentIndex-1;

end

else

found = 1;

Delay = Tcheck(CurrentIndex);

end

end

else

Delay = Tcheck(1);

end

return