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Noninvasive pulmonary arterial pressure estimation using a logistic-based systolic model

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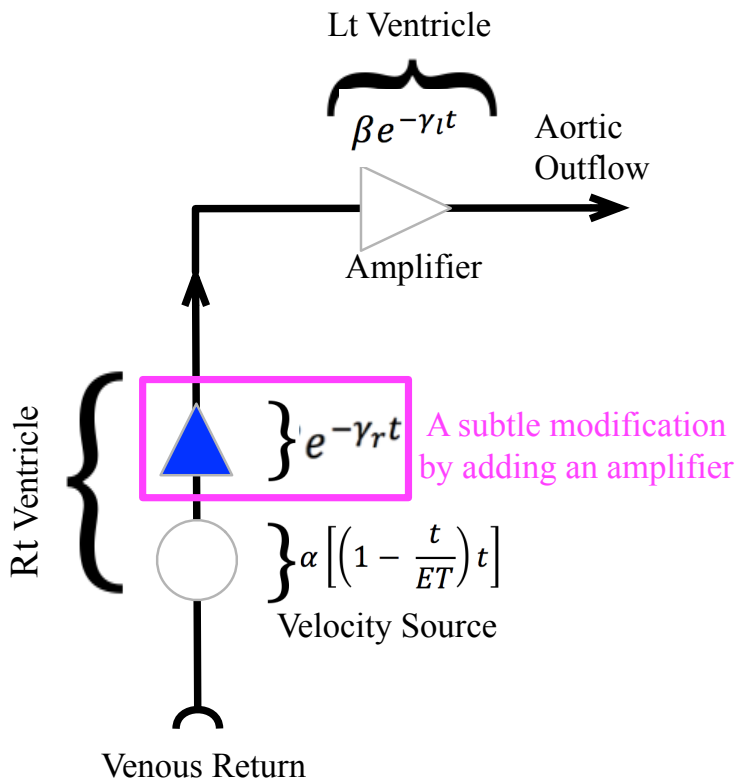
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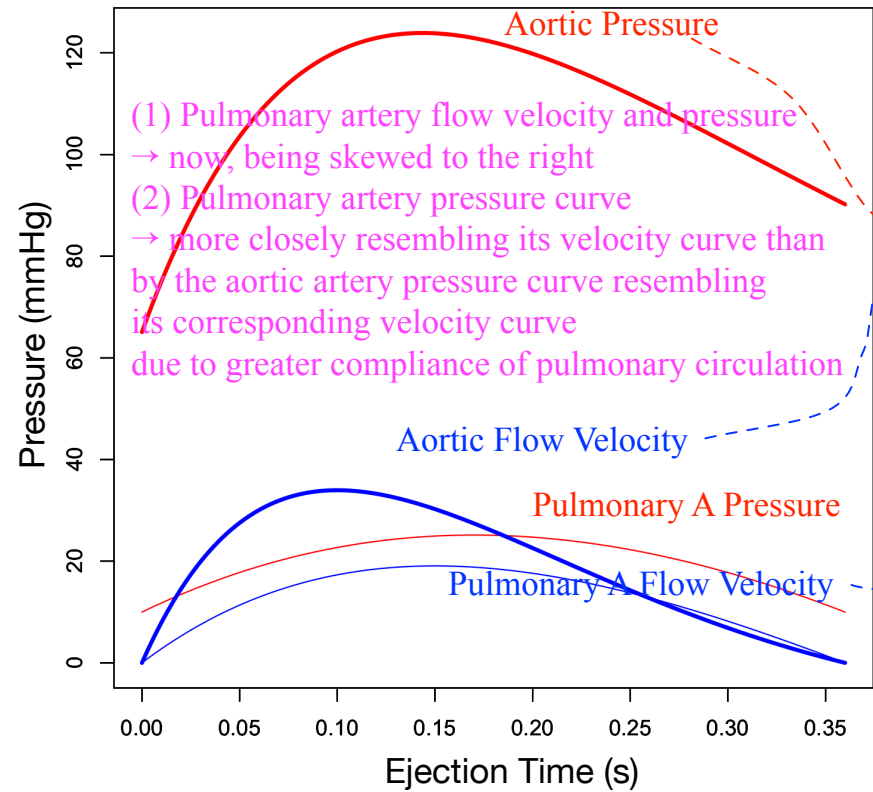
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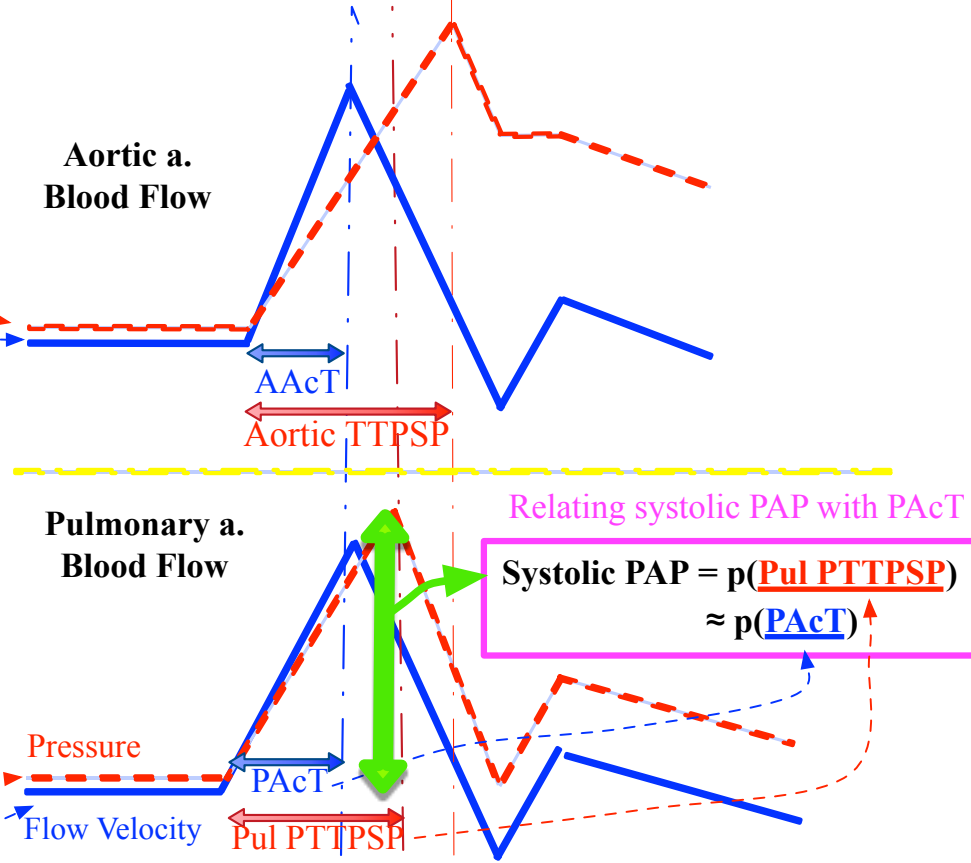
### The logistic-based systolic model



### Simulated results of the model



### Observational measurement on mammals



### Modified Bernoulli's equation:

$$\text{systolic PAP} = 4 \cdot \text{TR velocity}^2 + \text{RA pressure}$$

### Kitabatake's equation (1983):

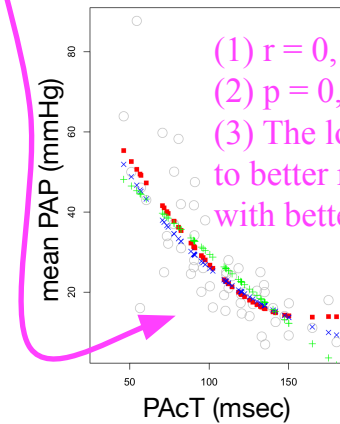
$$\log(\text{mean PAP}) = 2.1 - 0.0068 \cdot \text{PAcT}$$

### Mahan's equation (1987):

$$\text{mean PAP} = 79 - 0.45 \cdot \text{PAcT}$$

### Logistic-based PAP estimation equation (Present study):

$$\text{systolic PAP} = e^{p \cdot \text{PAcT}} \cdot [q + r \cdot \text{PAcT} + s \cdot \text{PAcT}^2] + u$$



- (1)  $r = 0, s = 0 \rightarrow$  Kitabatake's equation
- (2)  $p = 0, s = 0 \rightarrow$  Mahan's equation
- (3) The logistic-based PAP estimation equation seems to better reflect the concaved-up L-shaped distribution with better correlation on mean PAP and PAcT dataset.

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