Supplemental digital content 1

Mixed model equations

Comparison SHFJV vs single frequency JV (HFJV)

With the following equations, predicted values of the outcome variable can be calculated:

$$f(m,n) = Intercept \cdot Mode^{m} \cdot Frequency^{\ln(n)} \cdot Mode * Frequency^{m \cdot \ln(n)},$$

and for untransformed data,

$$f(m,n) = Intercept + m \cdot Mode + n \cdot Frequency + m \cdot n \cdot Mode * Frequency$$

applies.

A function of the outcome variable, $f(m,n)$, is described, with m being the mode of ventilation ($m=0$ for HFJV, $m=1$ for SHFJV) and n being the n-th increase in f_{HF} by 100 min^{-1} (e.g. $n=3$ for f_{HF}=300 min^{-1}). $Intercept$ corresponds to the predicted value of the outcome at zero frequency (or e^{0}=1, i.e., 100 min^{-1}, for log-transformed data). $Mode$ is the predicted influence of JV mode, $Frequency$ is the predicted influence of f_{HF} on the outcome variable.

Frequency and obstruction dependence of SHFJV

With the results from the mixed model analysis, a mathematical function describing the behavior of each of the outcome variables in dependency of frequency and obstruction can be formulated as follows:

$$f(ID,n) = Intercept \cdot Obstruction^{\ln(ID)} \cdot Frequency^{\ln(n)} \cdot Obstruction * Frequency^{\ln(ID)\cdot\ln(n)}$$

Exceptions from this general function are the two variables where deviant transformation was necessary:

$$PEEP_{UPPER} = f(ID,n) = Intercept + e^{ID} \cdot Obstruction + \ln(n) \cdot Frequency + e^{ID} \cdot \ln(n) \cdot Obstruction * Frequency$$

$$p_aO_2 = f(ID,n) = Intercept + \ln(ID) \cdot Obstruction + \ln(n) \cdot Frequency + \ln(ID) \cdot \ln(n) \cdot Obstruction * Frequency$$

The model is described by *f(ID,n)*, the function of the outcome variable in dependency of the stent ID and the *n*-th increase of f_{HF} by 100 min^{-1} (e.g. *n*=4 for f_{HF}=400 min^{-1}). *Intercept, Obstruction, Frequency* and *Obstruction*Frequency* are the predicted values from the mixed model analysis.