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COMPARING SENSITIVITY OF NON-INVASIVE MARKERS OF VOLUME RESPONSE TO INTRAVENOUS FUROSEMIDE IN PATIENTS WITH ACUTE PULMONARY OEDEMA.

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Introduction:

Intravenous furosemide (ivF) remains the first line treatment for pulmonary oedema (1) yet individual patient response to ivF is variable (2, 3). There is a need for an accurate, non-invasive means to define volume response to ivF, so that the role of alternative or additional treatments can be addressed.

Methods:

We studied patients presenting with florid pulmonary oedema treated with bolus ivF (50-100 mg). We compared echocardiographic and **Bodystat Quadscan 4000®** bioimpedance (BIA) volume estimates at 0, 0.5, 1, 2 and 3 hours from baseline.

Results:

31 patients (n=31; 18 male; 13 female; age 71.6±11.9, range 30-86; body surface area 1.86±0.22 m^2, range 1.37-2.30; 23 sinus rhythm, 8 atrial fibrillation; 13 ischaemia, 2 arrhythmia, 4 valvular heart disease, 3 lung disease, 3 renal disease, 2 non-ischaemic cardiomyopathy, 3 hypertension, 1 infection) were studied.

Early transmitral deceleration time (MV DecT), peak early transmitral velocity following valsalva manoeuvre (*v*MVPeakE), peak early transtricuspid velocity (TV Peak E), inferior vena cava diameter corrected for body surface area in expiration (IVCei) and in inspiration (IVCii), whole body impedance at frequencies 5-200 KHz (Ω_{5KHz}, Ω_{50KHz}, Ω_{100KHz}, Ω_{200KHz}) were the most sensitive parameters to define volume response to ivF in typical patients with pulmonary oedema (Table 1).

Parameter	n	Baseline	Maximal response	Maximal change (% baseline)	Maximal response time (h)	
MV DecT (ms)	30	204±72	244±92	23.9±33.5	3	*P=0.029*
*v*MVPeakE(m/s)	27	1.09±0.29	0.97±0.26	9.5±19.3	2	*P=0.025*
TV PeakE(m/s)	27	0.77±0.22	0.67±0.21	11.9±13.5	1	*p=0.010*
IVCei (cm/m^2)	28	1.23±0.33	1.14±0.31	4.8±21.6	3	*P=0.024*
IVCii (cm/m^2)	27	1.08±0.30	0.97±0.27	7.3±26.5	3	*P=0.005*
d Ω_{5KHz} (Ω)	31	497±147	518±160	4.1±6.3	3	*p=0.000*
d Ω_{50KHz} (Ω)	31	451±131	466±140	3.6±7.3	3	*p=0.005*
d Ω_{100KHz} (Ω)	31	431±126	447±132	4.3±9.7	3	*p=0.008*
d Ω_{200KHz} (Ω)	31	412±124	426±125	5.0±15.3	3	*p=0.047*

Table 1. Echocardiographic and BIA markers of volume response to ivF.

Conclusion:
Given the complexity of presentation with pulmonary oedema, the above measurements of volume response could be applied to optimise response to treatment.

References:
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