

# Serial monitoring of cardiac function and filling in 13 patients during therapeutic hypothermia following cardiac arrest: performance characteristics of the ClariTEE® probe\*

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## Aim

The clinical utility of invasive pressure monitoring in the setting of positive pressure ventilation and induced hypothermia following cardiac arrest is of questionable value. The introduction of a miniaturized disposable transesophageal echocardiography probe enables “at will” serial assessment of cardiac function and filling for up to 72 hours. This investigation examines the performance characteristics and echocardiographic information obtained from a miniaturized disposable transesophageal echocardiography probe in patients undergoing therapeutic hypothermia following out of hospital cardiac arrest.

## Methods

Therapeutic hypothermia was induced in 13 patients after resuscitation from out of hospital cardiac arrest. The ClariTEE™ (ImaCor, Uniondale, NY) probe was placed in all patients and assessment of cardiac function and filling was conducted “at will” by an intensivist certified in advanced perioperative transesophageal echocardiography. A retrospective analysis of the echocardiographic data obtained from the ClariTEE probe was completed.

## Results

A total of 40 imaging sessions were performed. The

success rate for obtaining the mid esophageal four chamber and transgastric mid papillary short axis views were 92.5% and 100% respectively. Endocardial border definition was adequate in 90% of imaging sessions to measure left ventricular end diastolic and systolic areas enabling calculation of fractional area of change. Assessment of right ventricular function was possible in 93% of imaging sessions. 12 imaging sessions provided information that changed hemodynamic management in the setting of ambiguous invasive pressure monitoring measurements. Regional wall motion abnormalities were observed during 16 imaging sessions.

## Conclusions

Serial monitoring of cardiac function and filling with the ClariTEE™ probe (including the qualitative assessment of right ventricular function and measurement of left ventricular end systolic and diastolic area) is possible in most patients during induced hypothermia following cardiac arrest. The authors conclude that the assessment of cardiac function and filling with ClariTEE™ probe reduces the ambiguity of hemodynamic assessment compared solely to invasive pressure monitoring and improves hemodynamic management.

**Table 1. Echocardiographic Observations with the ClariTEE™ probe during Therapeutic Hypothermia**

Time Period (Hours)	0	4	8	12	16	20	24	28	32	36	40	Total	Total %
Imaging Sessions Per Time Period	7	2	6	2	3	5	5	2	5	1	2	40	
ME 4 Chamber View Obtained	7	2	6	2	2	5	3	2	5	1	2	37	92.5
TG mid pap SAX View Obtained	7	2	6	2	3	5	5	2	5	1	2	40	100.0
Assessment of RV Function	7	2	6	2	2	5	3	2	5	1	2	37	92.5
Measurement of LVEDA	6	2	5	2	3	5	4	2	4	1	2	36	90.0
Calculation of FAC	6	2	5	2	3	5	4	2	4	1	2	36	90.0
Incidence of RWMA	5	0	4	0	2	2	0	0	2	1	0	16	

Table 1. Displays the echocardiographic observations made with the ClariTEE probe in 13 patients who underwent therapeutic hypothermia following out-of-hospital cardiac arrest. An imaging session is defined as the attempt to acquire a Mid esophageal four chamber view and a Transgastric mid papillary short axis view. Abbreviations LVEDA = Left Ventricle End Diastolic Area, ME = Mid Esophageal, TG = Transgastric, pap = papillary, SAX = Short Axis, FAC = Fractional Area Change, RWMA = Regional Wall Motion Abnormalities