VYGON

Value Life

MONITORING & CRITICAL ACCESS

most-care Up

Haemodynamic monitoring

CRITICAL CARE

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MostCare Up

The only monitor able to follow, in real time and from beat to beat, even the slightest haemodynamic variations in the patient

Based on the patented algorithm PRAM method (Pressure Recording Analytical Method), MostCare Up monitors cardiac output along with many other haemodynamic parameters without prior calibration or pre-determined data

Key benefits

MostCare Up is a reliable and efficient system that suits a wide range of patient types and clinical conditions

Thanks to its rapid set-up, information can be obtained in real time and saved, reviewed and transferred for subsequent analysis.

Simple
- No calibration needed
- Intuitive, customisable interface
- No change in protocols

Versatile
- Can be used on any peripheral or femoral artery
- Suitable for the widest range of patients
- Easily transferred from one patient to another

Quick
- Constant monitoring with immediate results
- Rapid connection and set-up

Convenient
- Can be used on numerous patients without disposable nor added elements
- *On Demand* system suitable for all uses

Innovative
- Exclusive variables (CCE, dicrotic pressure, Ea)
- Patented dynamic filter to guarantee the quality of the pressure signal
- Modern connectivity and data transfer systems

Reliable
- Patented and versatile algorithm
- Immediate response to even the smallest haemodynamic variations
- A wide range of clinical papers available.

Flexibility of use

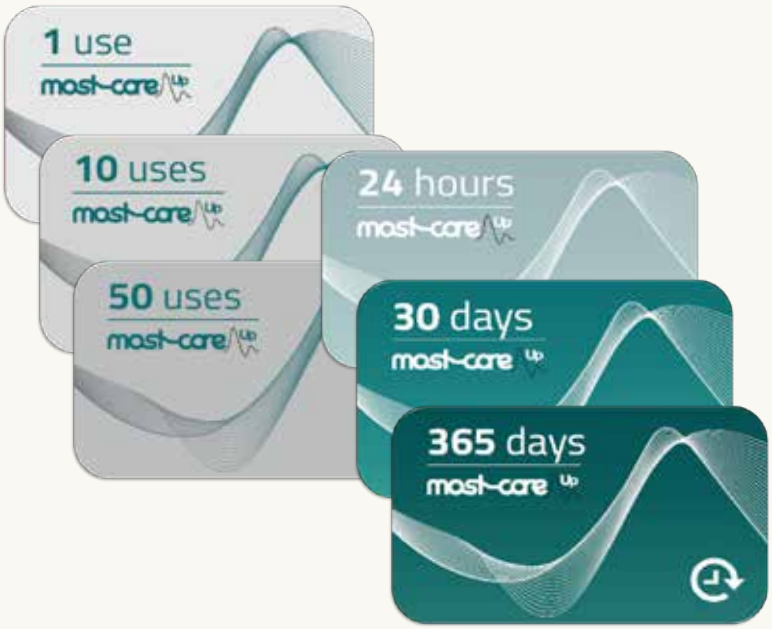
MostCare Up guarantees the maximum flexibility and cost efficiency thanks to the various ways in which it can be used. With no disposables attributed to it, this innovative product becomes more cost-effective with each patient use, meaning you no longer have to think cost, only best practice.

On Demand

The monitor can be activated via a card for a single use or for periods of time to meet specific application needs.

Endless

Allows an unlimited use of the system without additional cost. This is beneficial for hospitals with a large number of patients who need continually monitoring.

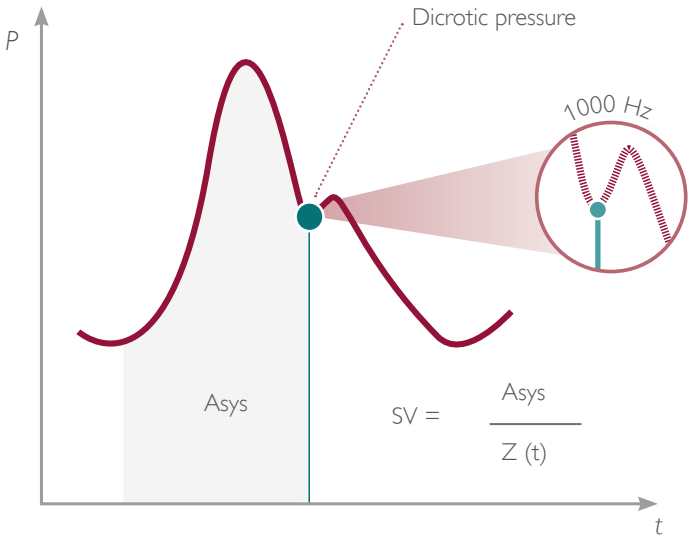


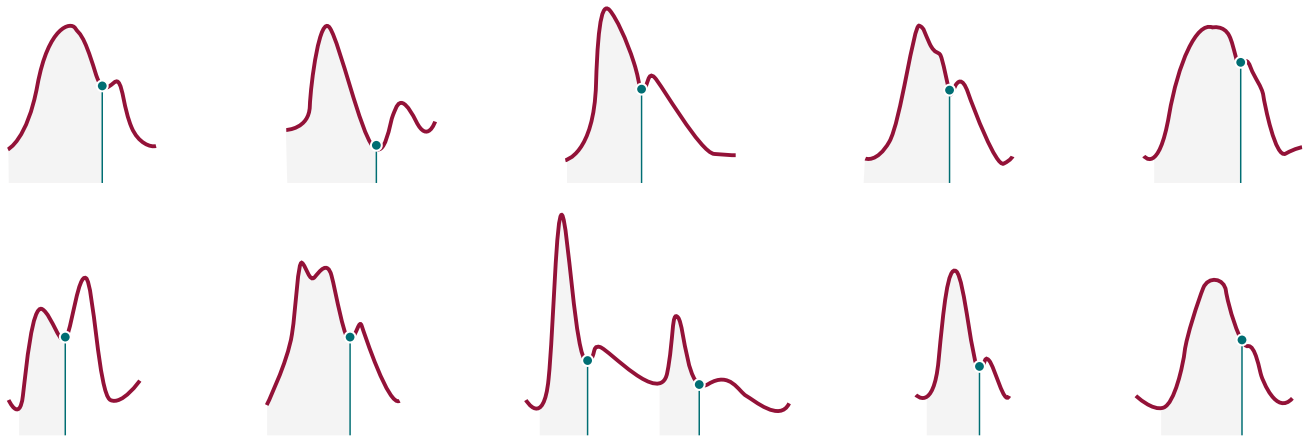
PRAM method

A patented algorithm

PRAM (Pressure Recording Analytical Method) is an innovative method to analyse the pressure wave used in MostCare Up[1]. It allows for constant and sensitive monitoring in real time of the slightest haemodynamic variations because it is based, heartbeat by heartbeat, only on the morphology of the arterial pressure wave.

- Sampling at 1000 Hz
- Beat-by-beat analysis of the wave form
- Does not depend on pre-estimates
- No external calibration required.



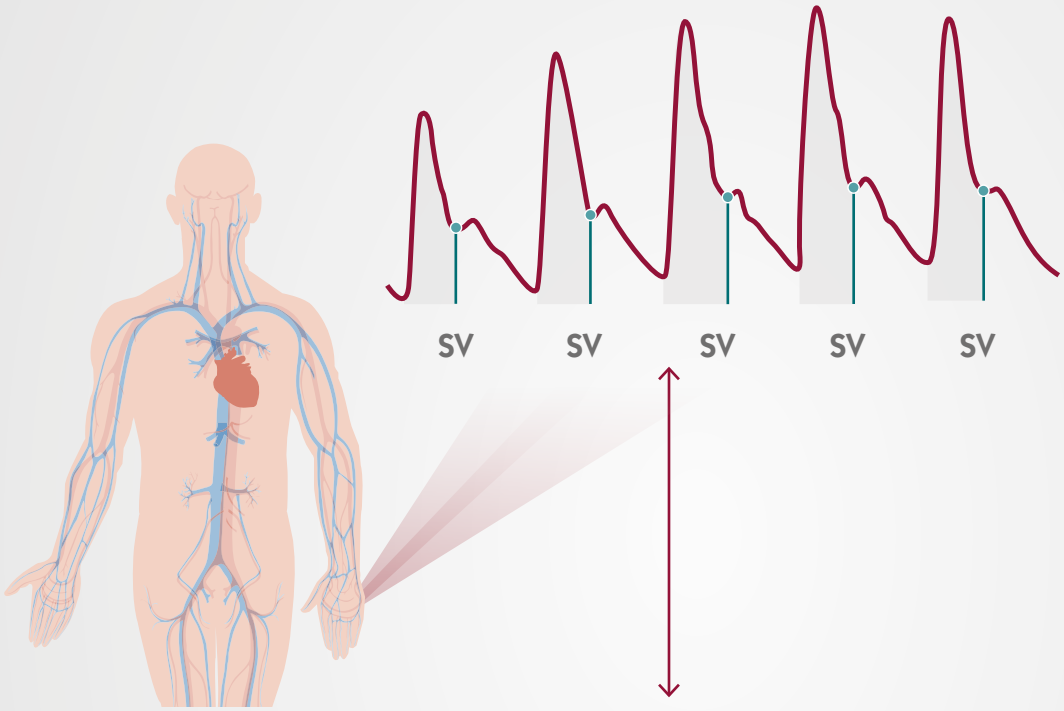


Atrial fibrilation | **Aortic counterpulsation** | **Fluid responsiveness** | **Aortic Insufficiency**

Vasodilatation | **Vasoconstriction**

Each of your patients is unique and their individual haemodynamic condition can evolve rapidly and differently. The shape of the arterial pressure wave is the result of a complex balance which depends on both the coupling of the cardiac function with the vascular system and their interaction with the respiratory system.

The precise analysis of the shape of the wave removes the need for calibration and pre-estimated data about the patient. It also identifies the dicrotic pressure and the Z(t) impedance of the cardiovascular system, even in cases of unusual pressure wave forms.



CO

Pulse rate	Preload	Contractility	Afterload
PR	SVV, PPV *response to fluids*	dP/dt_{max} *systolic function*	SVR, Ea
Chronotropic	Volume	Inotropes	Vasoactives

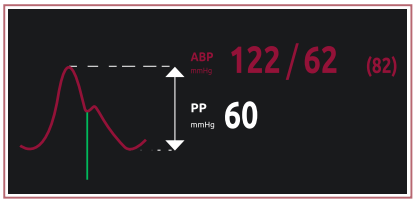
CPO

Efficiency

CCE

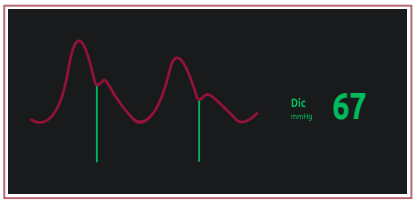
Haemodynamic variables

Including unique variables only to MostCare Up



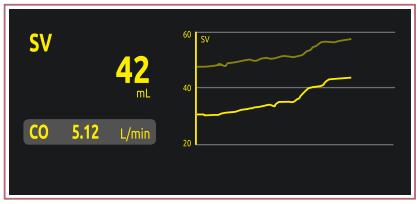
Pressure

Systolic, diastolic, mean and pulse pressure (PP) are measured with every heartbeat.



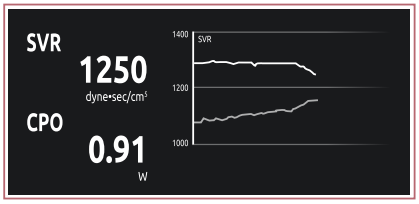
Dicrotic pressure

The value of the dicrotic pressure, gauged with precision at 1000Hz, provides information about the vascular condition and the ventricular-arterial coupling.



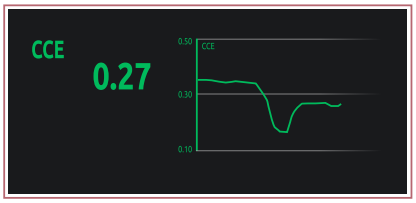
Cardiac output

The stroke volume (SV) is measured beat-by-beat and allows for the cardiac output (CO) to be calculated.



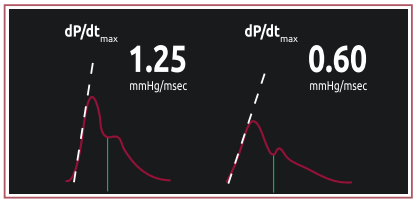
Derived variables

Systemic vascular resistance (SVR), cardiac power output (CPO) and oxygen delivery (DO_2) are examples of the derived variables provided by MostCare Up.



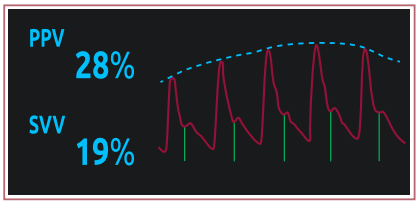
CCE

Cardiac cycle efficiency (CCE) is an exclusive variable which describes haemodynamic performance in terms of energy expenditure in the patient being monitored[2].



dP/dt max

The maximum pressure variation compared to time (dP/dtmax) is linked to the hearts contractility and also to the condition of the vascular system.



Dynamic variables

Pulse pressure variation (PPV) and stroke volume variation (SVV) during the respiratory cycle can be viewed simultaneously.

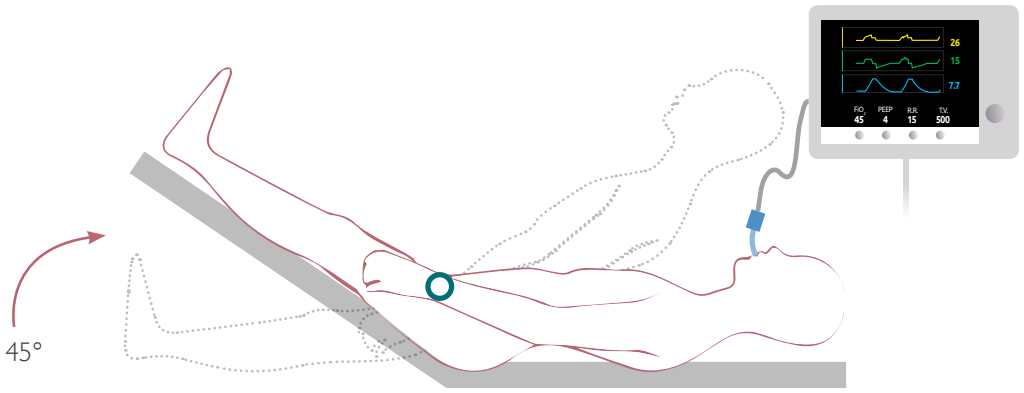
Dynamic filter

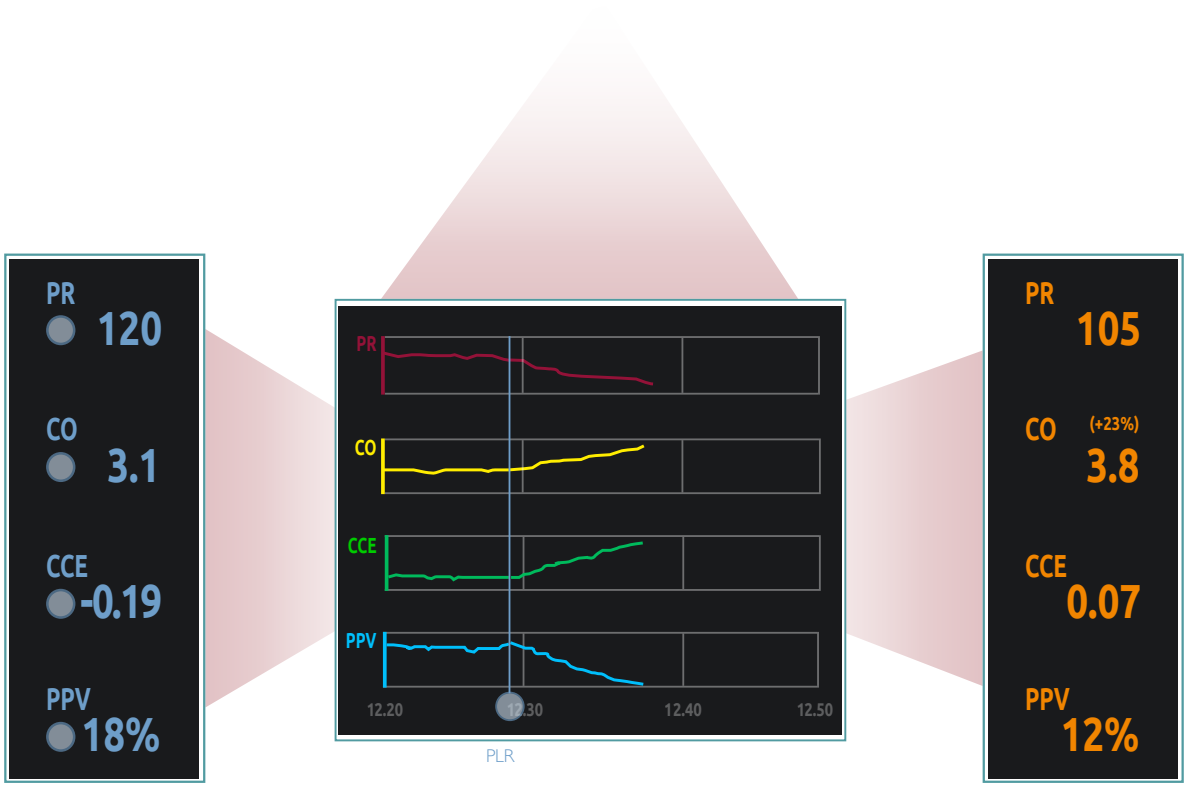
The shape of the pressure curve can be affected by resonance phenomena. The exclusive, dynamic filter in MostCare Up has been designed to automatically optimise the quality of the wave and to reduce these phenomena[3].

Markers and trends

MostCare Up can display trends for many haemodynamic variables simultaneously

It is also possible to insert personalised markers during specific events (e.g. start treatment). Designed specifically to help the clinic when monitoring haemodynamic variations following specific treatments (e.g. fluid challenge).





Connectivity and data management

MostCare Up supports the most advanced communication and data transmission standards

The patients parameters and screenshots can be saved to the machine's memory or exported via the USB port and can be transferred to the hospital's platform using the HL7 protocol. The image on the display can be shared for monitoring or educational purposes via HDMI.

Applications

The PRAM method requires no external calibration or anthropometric data

MostCare Up can therefore be easily used on any patient who requires constant or occasional haemodynamic monitoring, and, more specifically, during haemodynamic instability or in the presence of acute clinical variations in high risk patients.

Perioperative

Fluid optimisation in high risk surgery patients has significantly reduced postoperative complications and length of hospital stay, and improved patient outcomes, thus resulting in substantially lower costs. [4 - 6]

Intensive care and critical patients

Thanks to beat-by-beat analysis, the PRAM method is able to reliably recognise and monitor the haemodynamic changes resulting from the administration of vasoactive drugs and fluids, in real time and even in septic or trauma patients. [7 - 10]

Critical patient

The echocardiography is a gold standard technique to evaluate ventricular function. Some of the variables provided by MostCare Up (dP/dtmax and CCE) supply a constant stream of information about the cardiac function in the critical patient. [11]

Cardiac insufficiency

The beat-by-beat monitoring of haemodynamic variables like dicrotic pressure, dP/dtmax and CCE guarantees a rapid and immediate evaluation of any clinical variations in the patient so that immediate action can be taken. [12 - 14]

Paediatric & obstrectics

The beat-by-beat monitoring without anthropometric data allows monitoring patients outside of the national average. [15 - 17]

References and further reading

1. Romano SM, Pistolesi M. Assessment of cardiac output from systemic arterial pressure in humans. Crit Care Med 2002 Aug; 30(8): 1834-41.
2. Romano SM. Cardiac cycle efficiency: A new parameter able to fully evaluate the dynamic interplay of the cardiovascular system. Int J Cardiol 2012 Mar;155(2): 326-7.
3. Romagnoli S, Ricci Z, Quattrone D, Tofani L, Tujjar O, Villa G, Romano SM, De Gaudio A. Accuracy of invasive arterial pressure monitoring in cardiovascular patients: an observational study. Crit Care 2014 Nov 30;18(6):644.

Perioperative

4. Pearse R, Dawson D, Fawcett J, Rhodes A, Grounds RM, Bennett ED. Early goal-directed therapy after major surgery reduces complications and duration of hospital stay. A randomised, controlled trial. Crit Care 2005;9(6):R687-93.
5. Lopes MR, Oliveira MA, Pereira VO, Lemos IP, Auler JO Jr, Michard F. Goal-directed fluid management based on pulse pressure variation monitoring during high-risk surgery: a pilot randomized controlled trial. Crit Care 2007;11(5):R100.
6. Vincent JL, Pelosi P, Pearse R, Payen D, Perel A, Hoeft A, Romagnoli S, Ranieri VM, Ichai C, Forget P, Della Rocca G, Rhodes A. Perioperative cardiovascular monitoring of high-risk patients: An international consensus. Crit Care 2015 May 8;19:224.

Intensive care and critical patients

7. Vincent JL, Rhodes A, Perel A, Martin GS, Della Rocca G, Vallet B, Pinsky MR, Hofer CK, Teboul JL, de Boode WP, Scolletta S, Vieillard-Baron A, De Backer D, Walley KR, Maggiorini M, Singer M. Clinical review: Update on hemodynamic monitoring. A consensus of 16. Crit Care 2011 Aug;15(4):229.
8. Franchi F, Silvestri R, Cubattoli L, Taccone FS, Donadello K, Romano SM, Giomarelli P, McBride WT, Scolletta S. Comparison between an uncalibrated pulse contour method and thermodilution technique for cardiac output estimation in septic patients. Br J Anaesth 2011;107(2): 202-8.
9. Guarracino F, Ferro B, Forfori F, Bertini P, Magliacane L, Pinsky MR. Jugular vein distensibility predicts fluid responsiveness in septic patients. Crit Care 2014 Dec 5;18(6):647.
10. Donati A, Carsetti A, Tondi S, Scorcella C, Domizi R, Damiani E, Gabbanelli V, Münch C, Adrario E, Pelaia P, Cecconi M. Thermodilution vs pressure recording analytical method in hemodynamic stabilized patients. J Crit Care 2014 Feb;29(2): 260-4.

Critical patient

11. Scolletta S, Bodson L, Donadello K, Taccone FS, Devigili A, Vincent JL, De Backer D. Assessment of left ventricular function by pulse wave analysis in critically ill patients. Intensive Care Med 2013;39: 1025-33.

Cardiac insufficiency

12. Giglioli C, Landi D, Cecchi E, Chiostri M, Gensini GF, Valente S, Ciaccheri M, Castelli G, Romano SM. Effects of ULTRAfiltration vs DIureticS on clinical neurohormonal and hemodynamic variables in patients with deCOmpensated heart failure: the ULTRADISCO study. Eur J Heart Fail 2011;13(3): 337-46.
13. Pavoni V, Romagnoli S, Batignani G, Gianesello L, Horton A, Romano SM. Unsuspected Heart Failure: Usefulness of a Minimally Invasive Hemodynamic Monitoring System. J Anesth Clin Res 2012; 3(8).
14. Barile L, Landoni G, Pieri M, Ruggeri L, Maj G, Nigro Neto C, Pasin L, Cabrini L, Zangrillo A. Cardiac Index Assessment by the Pressure Recording Analytic Method in Critically Ill Unstable Patients After Cardiac Surgery. J Cardiothorac Vasc Anesth 2013 Dec;27(6): 1108-13.

Paediatric patient

15. Calamandrei M, Mirabile L, Musichetta S, Gensini GF, De Simone L, Romano SM. Assessment of cardiac output in children: a comparison between the pressure recording analytical method (PRAM) and the Doppler echocardiography method -a pilot study. Pediatr Crit Care Med 2008;9: 310-2.
16. Ricci Z, Haiberger R, Pezzella C, Garisto C, Favia I, Cogo P. Furosemide versus ethacrynic acid in pediatric patients undergoing cardiac surgery: a randomized controlled trial. Crit Care. 2015 Jan 7;19(1):2.
17. Garisto C, Favia I, Ricci Z, Romagnoli S, Haiberger R, Polito A, Cogo P. Pressure recording analytical method and bioreactance for stroke volume index monitoring during pediatric cardiac surgery. Paediatr Anaesth 2015 Feb;25(2):143-9.

Ventilation

18. McBride WT, Ranaldi G, Dougherty MJ, Siciliano T, Trethowan B, Elliott P, Rice C, Scolletta S, Giomarelli P, Romano SM, Linton DM. The hemodynamic and respiratory effects of continuous negative and control-mode cuirass ventilation in recently extubated cardiac surgery patients: part 2. J Cardiothorac Vasc Anesth 2012;26: 873-7.

Obese patient

19. Balderi T, Forfori F, Marra V, Di Salvo C, Dorigo M, Anselmino M, Romano SM, Giunta F. Continuous Hemodynamic Monitoring During Laparoscopic Gastric Bypass in Superobese Patients by Pressure Recording Analytical Method. Obes Surg 2008 Aug;18(8): 1007-14.

Aortic counterpulsation

20. Zangrillo A, Maj G, Monaco F, Scandroglio AM, Nuzzi M, Plumari V, Virzo I, Bignami E, Casiraghi G, Landoni G. Cardiac Index Validation Using the Pressure Recording Analytic Method in Unstable Patients. J Cardiothorac Vasc Anesth 2010;24: 265-9.
21. Gelsomino S, Renzulli A, Rubino AS, Romano SM, Lucà F, Valente S, Gensini GF, Lorusso R. Effects of 1:1, 1:2 or 1:3 intra-aortic balloon counterpulsation/heart support on coronary haemodynamics and cardiac contractile efficiency in an animal model of myocardial ischaemia/reperfusion. Eur J Cardiothorac Surg 2012;42: 325-32.
22. Onorati F, Santini F, Amoncelli E, Campanella F, Chiominto B, Faggian G, Mazzucco A. How should I wean my next intra-aortic balloon pump? Differences between progressive volume weaning and rate weaning. J Thorac Cardiovasc Surg 2012;145: 1214-21.

Interventional cardiology

23. Romagnoli S, Romano SM, Bevilacqua S, Lazzeri C, Santoro G, Ciappi F, Gelsomino S, Dini D. Pulse contour cardiac output monitoring during a complicated percutaneous aortic valve replacement. J Cardiothorac Vasc Anesth 2010 Apr;24(2): 303-5.
24. Giglioli C, Tujjar O, Cecchi E, Landi D, Chiostri M, Valente S, Baldereschi GJ, Meucci F, Gensini GF, Romano SM. Hemodynamic changes acutely determined by primary PCI in STEMI patients evaluated with a minimally invasive method. World J Cardiovasc Dis 2013;3: 69-72.

Hypothermia therapy

25. Lazzeri C, Sori A, Bernardo P, Chiostri M, Tommasi E, Zucchini M, Romano SM, Gensini GF, Valente S. Cardiovascular effects of mild hypothermia in post-cardiac arrest patients by beat-to-beat monitoring. A single centre pilot study. Acute Card Care. 2014 Jun;16(2):67-73

Variables of MostCare Up

Haemodynamic variables		Formulas	Physiological range ***	Units
Pressures				
Sys	Systolic pressure			mmHg
Dia	Diastolic pressure			mmHg
MAP	Mean arterial pressure			mmHg
Dic	Dicrotic pressure		70 ÷ 105	mmHg
PP	Pulse pressure	Psys-Pdia	30 ÷ 50	mmHg
MAP-Dic	Mean and dicrotic pressure difference	MAP-Dic	-10 ÷ +10	mmHg
CVP*	Central venous pressure			mmHg
Cardiac output				
SV	Stroke volume		60 ÷ 100	mL
SVI	Stroke volume index		35 ÷ 45	mL/m^2
SV_{kg}	Weighted stroke volume	SV/weight		mL/kg
CO	Cardiac output		4.0 ÷ 8.0	L/min
CI	Cardiac output index		2.6 ÷ 3.8	L (min· m^2)
SVR	Systemic vascular resistance	(MAP-CVP)/CO· 80	800 ÷ 1400	dyne· sec/cm^5
SVRI	Systemic vascular resistance index	(MAP-CVP)/CI· 80	1600 ÷ 2400	dyne· sec· m^2/cm^5
Oxygen delivery				
SpO_2*	Arterial oxygen saturation		96 ÷ 100	%
DO_2*	Oxygen delivery	$DO_2 = CO· CaO_2$ con CaO_2=Hb· 1,34· SaO_2	900 ÷ 1000	mL/min
DO_2I *	Oxygen delivery index	$DO_2I = DO_2/BSA$	500 ÷ 600	mL/min/m^2
Efficiency and cardiac function				
dP/dt_{max}	Maximal slope of the systolic upstroke		0.9 ÷ 1.3	mmHg/msec
CCE	Cardiac cycle efficiency		-0.2 ÷ 0.3	units
CPO	Cardiac power	MAP· CO/451	0.80 ÷ 1.20	W
CPI	Cardiac power index	MAP· CI/451	0.50 ÷ 0.70	W/m^2
Vascular function				
Ea	Arterial elastance	Dic/SV	1.10 ÷ 1.40	mmHg/mL
PPV/SVV	Dynamic elastance	PPV/SVV		units
Z_{tot}	Cardiovascular impedance			mmHg· sec/mL
Dynamic variables				
PPV	Pulse pressure variation		< 15**	%
SVV	Stroke volume variation		< 15**	%
SPV	Systolic pressure variation			%
DPV	Dicrotic pressure variation			%
Other specific variables				
PR	Pulse rate			1/min
Dia_{pk}	Diastolic peak			mmHg

* When added probes are used. DO_2 and DO_2I calculated with fixed Hb value.
** Approximate values reported in the literature in the patient receiving controlled mechanical ventilation.
*** Normal values in the adult patient. The values depend on the patient in relation to the clinical conditions.
BSA = body surface area, calculated by the standard formulas of DuBois & DuBois, using the values of weight and height.

Ordering information

Monitors	
VMB08MC0202E2V	MostCare Up monitor - On Demand version with rigid case
VMB08MC0255E2V	MostCare Up monitor - Endless version with rigid case

Cards	
VMB04MCU1D02	MostCare Up card - 24 hours (1 day)
VMB04MCU1M02	MostCare Up card - 30 days (1 month)
VMB04MCU1Y02	MostCare Up card - 365 days (1 year)
VMB04MCU01U02	MostCare Up card - 1 use (72h)
VMB04MCU10U02	MostCare Up card - 10 uses (72h each)
VMB04MCU50U02	MostCare Up card - 50 uses (72h each)

Cables From a standard monitor to MostCare Up - Y cable	
VMC03MUYBBR	MostCare Up BP Y CABLE - BBraun transducer type connection
VMC03MUYBD	MostCare Up BP Y CABLE - BD transducer type connection
VMC03MUYBIO	MostCare Up BP Y CABLE - Biosens.Utah transd. type connection
VMC03MUYDPT	MostCare Up BP Y CABLE - Codan DPT transducer type connection
VMC03MUYEDW	MostCare Up BP Y CABLE - Edwards transducer type connection
VMC03MUYMED2	MostCare Up BP Y CABLE - Medex TranSt. transd. type connection

Cables From an arterial catheter pressure transducer	
VMC03MUBBR	MostCare Up BP CABLE - BBraun transducer type connection
VMC03MUBD	MostCare Up BP CABLE - BD transducer type connection
VMC03MUBIO	MostCare Up BP CABLE - Biosens.Utah transd. type connection
VMC03MUDPT	MostCare Up BP CABLE - Codan DPT transducer type connection
VMC03MUEDW	MostCare Up BP CABLE - Edwards transducer type connection
VMC03MUMED	MostCare Up BP CABLE - Medex LogiCal transd. type connection
VMC03MUMED2	MostCare Up BP CABLE - Medex TranSt. transd. type connection

For further information, please contact: vygon@vygon.co.uk

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Vygon (UK) Ltd, The Pierre Simonet Building, V Park, Gateway North,
Latham Road, Swindon, Wiltshire SN25 4DL
Tel: 01793 748800 Fax: 01793 748899 Email: vygon@vygon.co.uk
vygon.co.uk @vygonuk vygonuk vygonuk vygonuk

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