



Medtronic
Engineering the extraordinary

Citrate 20/4 anticoagulation

Powered by Amplya acute
multitherapeutic system™



Extracorporeal circuit anticoagulation

Extracorporeal circuit anticoagulation is a key prerequisite for delivery of an adequate renal replacement therapy dose.^{1,2}

Acute Kidney Injury (AKI) is a common complication among critically ill adult patients.

Patients with AKI could require Renal Replacement Therapy (RRT).

368K

AKI patients in Europe³

313K

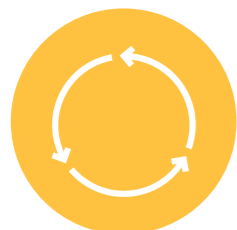
RRT procedures in Europe³

Guideline Recommendations



The international KDIGO (Kidney Disease Improving Global Outcomes) guidelines suggests using regional citrate anticoagulation (RCA) rather than heparin in patients who do not have contraindications for citrate.⁴

Benefits of citrate associated to RCA⁵



Prolonged circuit and filter survival.



Lower bleeding risk associated to RCA.



Citrate accumulation is a feared and potentially lethal complication of RCA.⁶

How to overcome citrate toxicity?

Well designed protocols should aim to minimize citrate delivery to patients.⁶

This goal can be achieved by combining different measures:



Citrate solution

Diluted citrate solutions in predilution⁶



Citratemia

Lower citrate concentration targets in the circuit¹



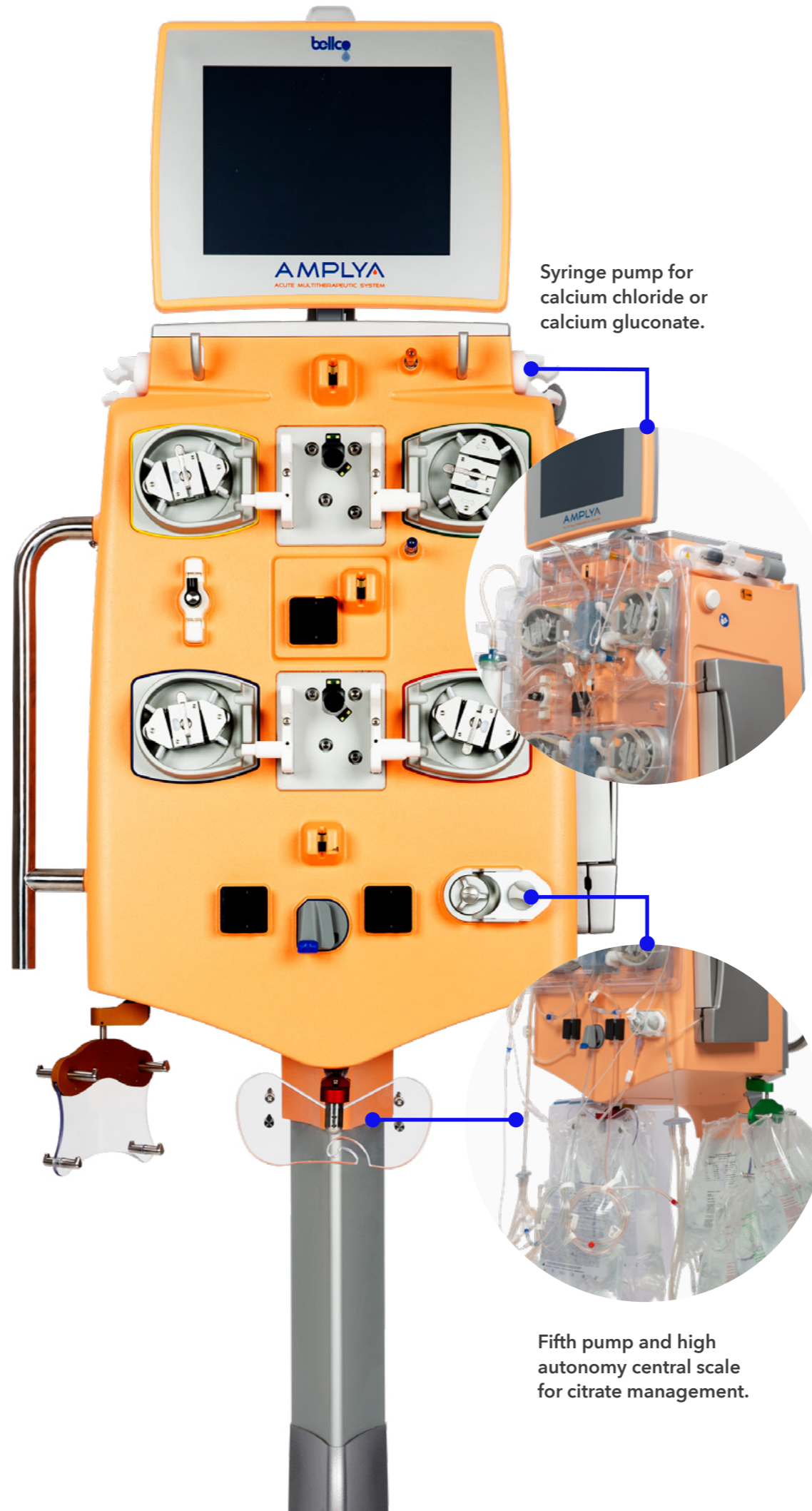
Setting

Appropriate setting and subsequent adjustments of the main CRRT parameters¹



Monitoring

Close monitoring, especially upon initiation of therapy⁷



Syringe pump for calcium chloride or calcium gluconate.

Fifth pump and high autonomy central scale for citrate management.

The Medtronic solution:

Amplya Assisted Citrate 20/4 protocol

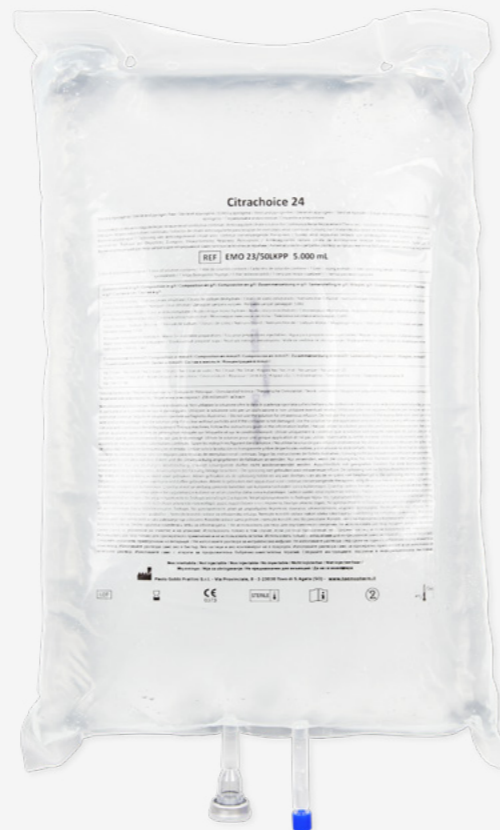
- Combined assisted citrate modality and 24 mmol/l concentration option with Citrachoice 24 bag.
Low-concentration citrate in predilution bags.⁶
- RCA management based on citrate plasma concentration.
Lower citrate accumulation.⁶
- Assisted citrate modality.
Enables operators to manage the treatment protocol without tables, providing suggested settings based on treatment type and monitoring.⁸

Combined assisted citrate modality and 24mmol/l concentration option with Citrachoice 24

Citrachoice 24

Composition in mmol/l

Na-citrate	20
Citric Acid	4
Na ⁺	146
Cl ⁻	86



Assisted Citrate modality with Citrachoice 24 provides a number of benefits⁸⁻¹⁰

	Clinical considerations			Economic considerations		
	Lower metabolic alkalosis	Lower need for citrate	RCA availability in CVH modality	Lower amount of anticoagulation solution needed	Space in warehouse	Cost for RCA
Diluted citrate 20/4	+	+	+	+	+	+
Diluted citrate 10/2 and 18/0	+	+	+	-	-	-
Concentrate citrate Tri sodium citrate (TSC) 4%	-	-	-	++	++	++

RCA management based on citrate plasma concentration

Citrate plasma concentration formula¹¹

Conc. [cit. Blood] =

$$\frac{Q_{pre} \times \text{Conc. [cit. Bag]}}{Q_{pre} + QB (1 - HT/100)}$$

Conc. [cit. Blood]:

Concentration of citrate in the blood expressed in mmol/l

Qpre:

Infusion flow of the solution containing citrate expressed in ml/h

Conc. [cit. Bag]:

Concentration of citrate in the bag expressed in mmol/l

QB:

Flow of treated blood, or the amount of blood treated in the unit of time expressed in ml/h

HT:

Hematocrit

The citrate plasma concentration setting reduces the possibility of citrate accumulation and related complications.⁶

Assisted citrate modality

The assisted citrate modality helps operators manage the treatment protocol without tables, providing suggested settings based on treatment type.⁸

In locoregional anticoagulation assisted citrate modality sets treatment data based on patient ideal weight and blood flow.

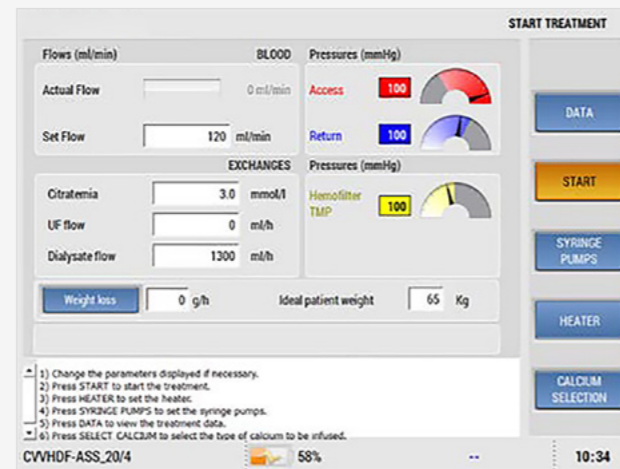
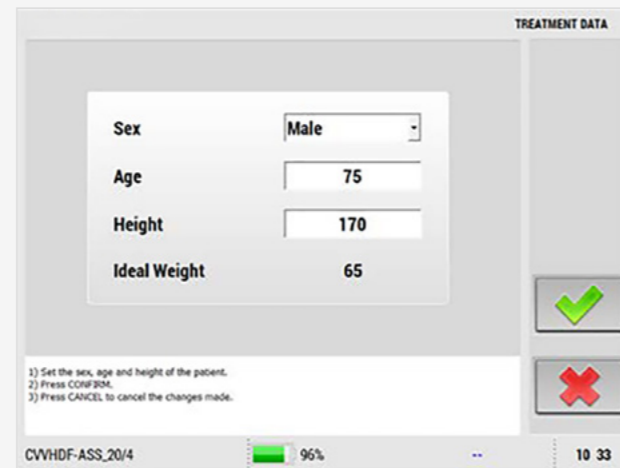
Offering parameter values guidance during RRT and CPFA treatments.

Infusion flow
Dialysate flow

Citrate flow
Calcium flow

Requiring systemic Ca²⁺ value control.

Calcium level monitoring ¹²	Timing			
Ionized systemic Ca ²⁺ (range 1,0-1,2 mmol/l)	30'	1 h	2 h	6 h



The added value of Amplya system™



High treatment autonomy due to the 12kg central scale fluid capacity (citrate)⁸



Possibility of using FREE CITRATE mode also referred to as "unassisted" mode, manually selecting the appropriate settings for each treatment⁸



Support for nurses to manage systemic ionized calcium modifying calcium flow relying on value inserted⁸



Bag changes with running pumps:

- Help to maintain the prescribed dose⁸
- Avoid citrate pump stoppage during the treatment⁸
- Reduce events of coagulation of circuits with reduced relative blood loss¹³



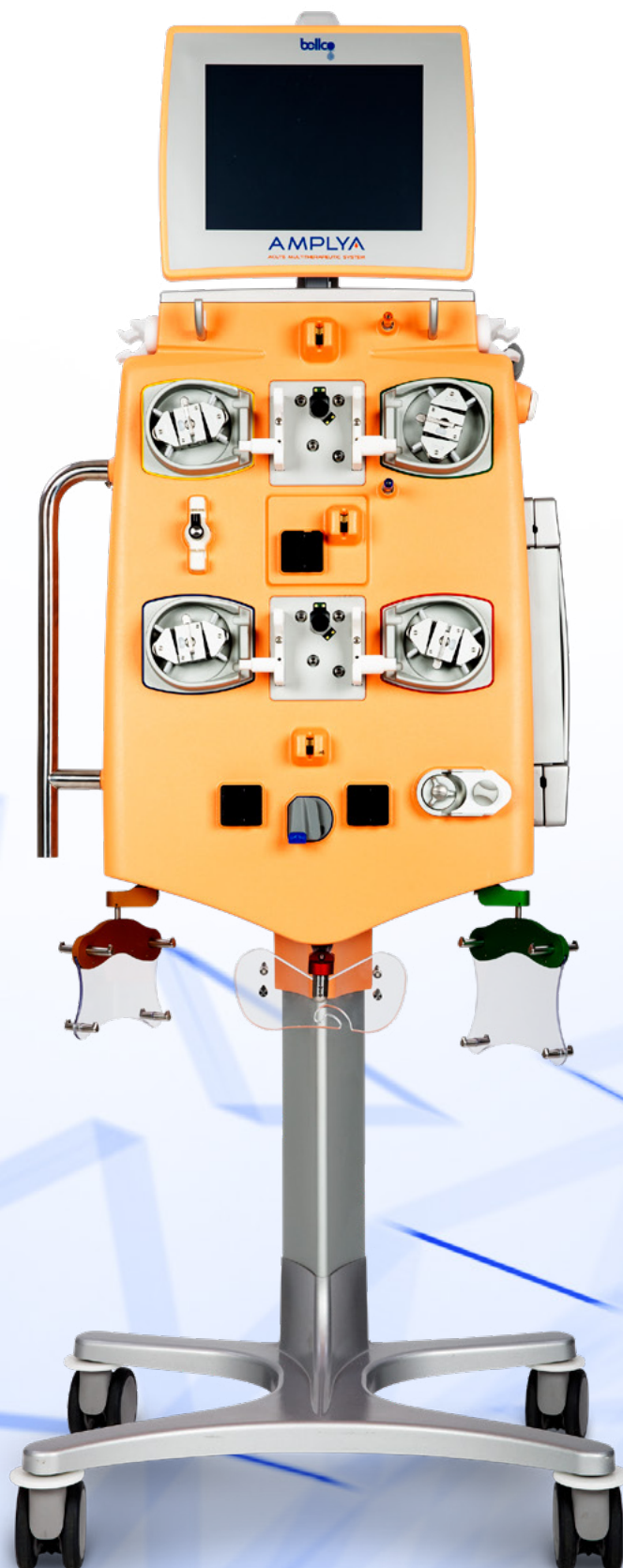


Questions? Call or email your Medtronic representative.

Amplya system™ is an active, non-invasive, class IIb medical device CE0123 manufactured by Bellco S.r.l.
Pre-assembled device for RRT for Amplya is a non-active, non-invasive, class IIb medical device CE0123 manufactured by Bellco S.r.l.
Pre-assembled device for CPFA for Amplya is a non-active, non-invasive, class IIb medical device CE0123 manufactured by Bellco S.r.l.
The device is included in KABL14P05 - KIT CPFA X AMPLYA Procedure Pack.
Infusion line for Amplya is a non-active, non-invasive, class Is medical device CE0123 manufactured by Bellco S.r.l.
Citrachoice 24 is a medical device CE0373 manufactured by Paolo Gobbi Frattini S.r.l.

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Important: please refer to the devices and procedure pack Instructions for Use for complete instructions, contraindications, warnings and precautions.

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