

Citrate Anticoagulation Treatment in Hemodialysis Therapy

Since the 1960s anticoagulation with citrate solutions is known and since 1980 it is used for clinical applications. It is used for blood anticoagulation in extracorporeal circulation as an alternative for patients allergic to heparin and in operative intensive care to reduce bleeding risk during surgery.

The principle involved is simple: Sodium citrate is a Chelate formator and builds with multiple positive charged electrolyts (Ca²⁺, Mg²⁺) an insoluble complex. The level of ionized calcium is reduced and blood coagulation inhibited. Approx. 50% of this citrate calcium complex is eliminated by dialysate before the rest is undergoing metabolism via citric acid cycle of liver, kidney and skeletal muscles converted into bicarbonate. Neutralisation of hemodilution is then neutralised by addition of intravenous calcium solution.

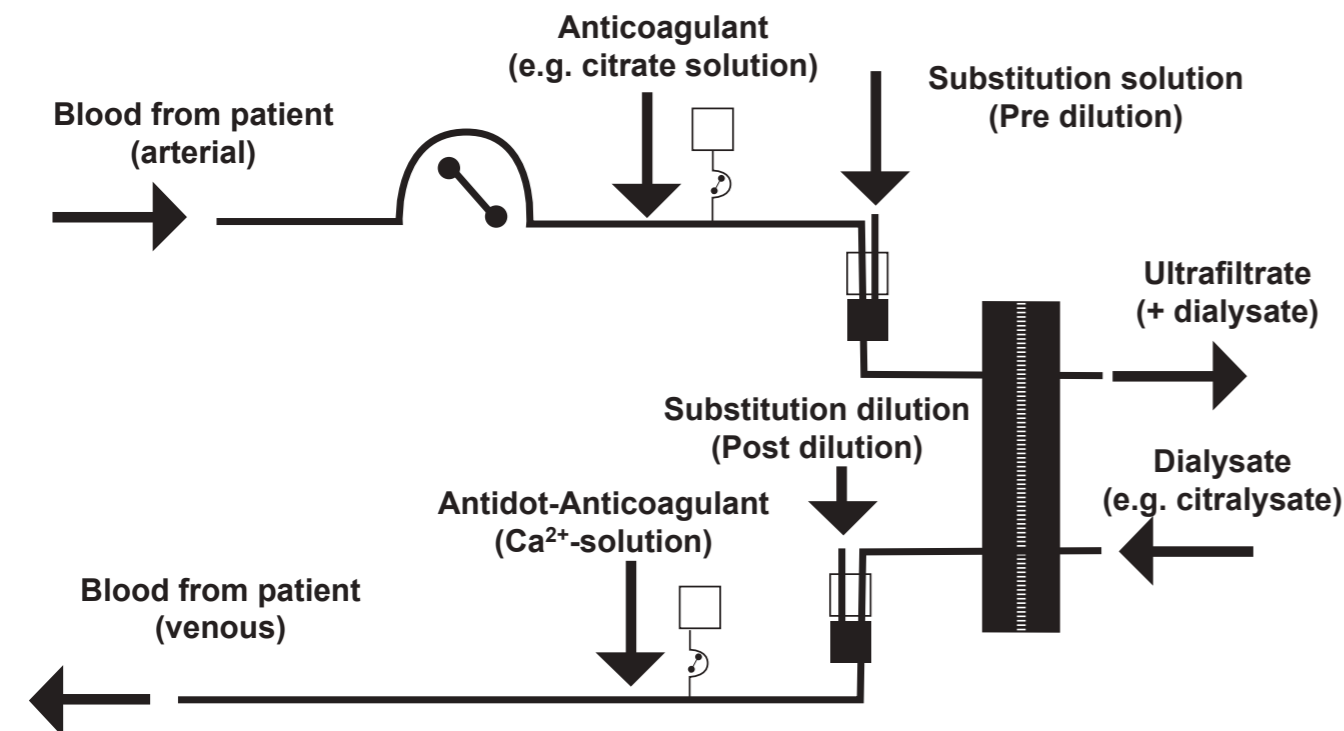
Treatment of Meise citrate anticoagulation solutions can be done with all known hemodialysis machines used in intensive care.

Arguments at first view

- + natural metabolite - easily metabolized in the liver
- + Effect of anticoagulant only in extracorporeal circulation
- + no adverse effects
- + increased survival (studies)
- + extension of service life of dialysis filters



Possible places for the use of solutions in extracorporeal circulation



Solutions for Citrate Anticoagulation

Solutions for Sodium Citrate anticoagulation are sterile, pyrogenfree and clear in a phtalat-free bag out of Polypropylen (PP). Either in a secondary packaging made of Polyethylene foil or equipped with a patented connector lock. The product is available - depending on concentration - in bags with 250 ml, 500 ml, 1.000 ml and 2.000 ml.



Sodium Citrate 4%, 14,7%, 35,3%

Product	Size	Composition of Solution		pH-value
		in mmol/l	g/l	
Sodium Citrate 4%	1.000 ml	136	40	6,4 - 7,5
Sodium Citrate 4%	2.000 ml	136	40	6,4 - 7,5
Sodium Citrate 14,7% (0,5 M)	500 ml	500	147	6,4 - 7,5
Sodium Citrate 35,3% (1,2 M)	250 ml	1200	353	6,4 - 7,5

Solutions for Citrate Anticoagulation

Product	Composition of Solution							pH-value*
	Na ⁺	K ⁺	Ca ⁺⁺	Mg ⁺⁺	Cl ⁻	HCO ₃ ⁻	Glucose	
Citralysat calcium-free								
Double-chamber bag 5.000 ml	mmol/l	mmol/l	mmol/l	mmol/l	mmol/l	mmol	g/l	
Citralysat K0	133	0,0	0	0,75	116,5	20	1,0	7,0 - 9,0
Citralysat K2	133	2,0	0	0,75	116,5	20	1,0	7,0 - 9,0
Citralysat K4	133	4,0	0	0,75	118,5	20	1,0	7,0 - 9,0

*ph-value after mixing both chambers

PLUS Solutions for Citrate Anticoagulation

Product	Composition of Solution							pH-value*
	Na ⁺	K ⁺	Mg ²⁺	Cl ⁻	HCO ₃ ⁻	H ₂ PO ₄ ⁻	Glucose	
Citralysat calcium-free								
Double-chamber bag 5.000 ml	mmol/l	mmol/l	mmol/l	mmol/l	mmol/l	mmol/l	g/l	
Citralysat K2 plus	133	2,0	1,0	115,75	20	1,25	1,0	7,4
Citralysat K4 plus	133	4,0	1,0	117,75	20	1,25	1,0	7,4

*ph-value after mixing both chambers

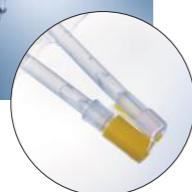
Lactocitrat®

Lactocitrat® is a newly developed and patented lactate-buffered dialysate which is extremely well-suited for combination with citrate CRRT. For example Lactocitrat® contains a normal level of magnesium thus reducing effects such as arrhythmias, myopathie caused by magnesium deficiency. Furthermore Lactocitrat® contains phosphate, which lacks in standard CRRT solutions. CRRT therapy however indicates at early stage continuous phosphate substitution to avoid hypophosphatemia. The single chamber bag 5.000 ml Lactocitrat® can be used and balanced with the standard market machines. The bag is equipped with the usual connectors for all standard hemofiltration machines. In addition the single-chamber bag allows long stability.

Product	Composition of Solution							pH-value*
	Na ⁺	K ⁺	Mg ²⁺	Cl ⁻	H ₂ PO ₄ ⁻	Glucose	Laktat	
Lactocitrat	130	2,0	1,5	116	1,0	5,6	18,0	6,8

Calciumchlorid 0.5 M in 250 ml bag

Product Overview



Solutions of Meise such as Sodium citrate 4%, 14,7% and 35,3% and Citralysate K0/K2/K4 are sterile, pyrogen-free, colorless solutions in a transparent printed PP-bag (no PVC) and are equipped with a patented original seal. This saves secondary packaging and helps to preserve the environment. Bags are equipped with breakable connectors with Savelock (S) and Tulip (T).

Meise-Article-No.	Product	Bags per Box
100219	Sodium citrate 4%, 1.000 ml bag (Natrium Citricum)	11
100209	Sodium citrate 4%, 2.000 ml bag (Natrium Citricum)	6
100224	Sodium citrate 14,7%, 500 ml bag (Natrium Citricum)	20
	Sodium citrate 35,3%, 250 ml bag (Natrium Citricum)	32
	Citralysate, Dialysate K0 for citrate-anticoagulation therapy	2
100217	Citralysate, Dialysate K2 for citrate-anticoagulation therapy 5-liter double-chamber bag	2
100218	Citralysate, Dialysate K4 for citrate-anticoagulation therapy 5-liter double-chamber bag	2
100232	Citralysat, Dialysat K2 PLUS for citrate-anticoagulation therapy 5-liter double-chamber bag	2
100233	Citralysat, Dialysat K4 PLUS for citrate-anticoagulation therapy 5-liter double-chamber bag	2
	Lactocitrat® Dialysat for citrate-anticoagulation therapy 5-liter one-chamber bag	2
100229	Calcium chloride 250 ml bag	32

Manufactured by:



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Citrate Solutions for Haemofiltration Therapy

