ANTE
Associazione Nazionale Tecnici Emodialisi

XXX Corso Nazionale ANTE - Dialisi e Tecnologia
"Presente e futuro della Nefrologia Italiana"

17-18-19 Aprile 2023 Sala Congressi Hotel Mediterraneo
Piazzale Roma, 3, 7838 Riccione RN

Come si organizza un servizio di dialisi per la gestione dell'area critica?

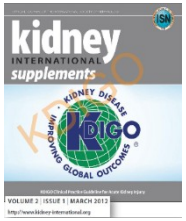
Marita Marengo
Stefania Zeri

SC Nefrologia e Dialisi
ASLCN1

AKI
Acute Kidney Injury

2.1.2: AKI is staged for severity according to the following criteria (Table 2)

Stage	Serum creatinine	Urine output
1	1.5–1.9 times baseline OR ⩾0.3 mg/dl (⩾26.5 μmol/l) increase	<0.5 ml/kg/h for 6–12 hours
2	2.0–2.9 times baseline	<0.5 ml/kg/h for ⩾12 hours
3	3.0 times baseline OR Increase in serum creatinine to ⩾4.0 mg/dl (⩾353.6 μmol/l) OR Initiation of renal replacement therapy OR, In patients <18 years, decrease in eGFR to <35 ml/min per 1.73 m^2	<0.3 ml/kg/h for ⩾24 hours OR Anuria for ⩾12 hours

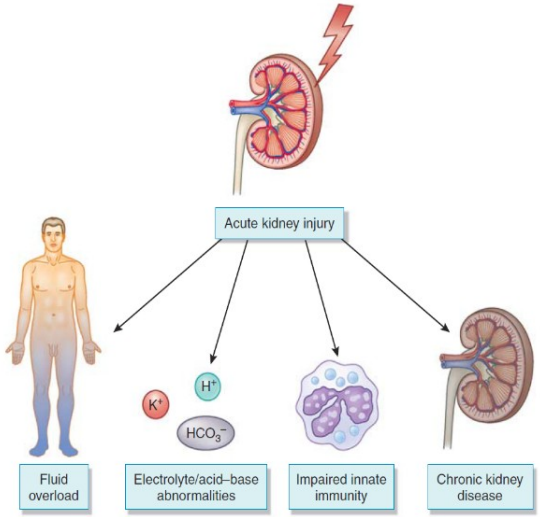


www.kdigo.org/home/guidelines/acute-kidney-injury

AKI in the ICU: definition, epidemiology, risk stratification, and outcomes

Kai Singbartl[1] and John A. Kellum[1]

Kidney International (2012) **81**, 819–825



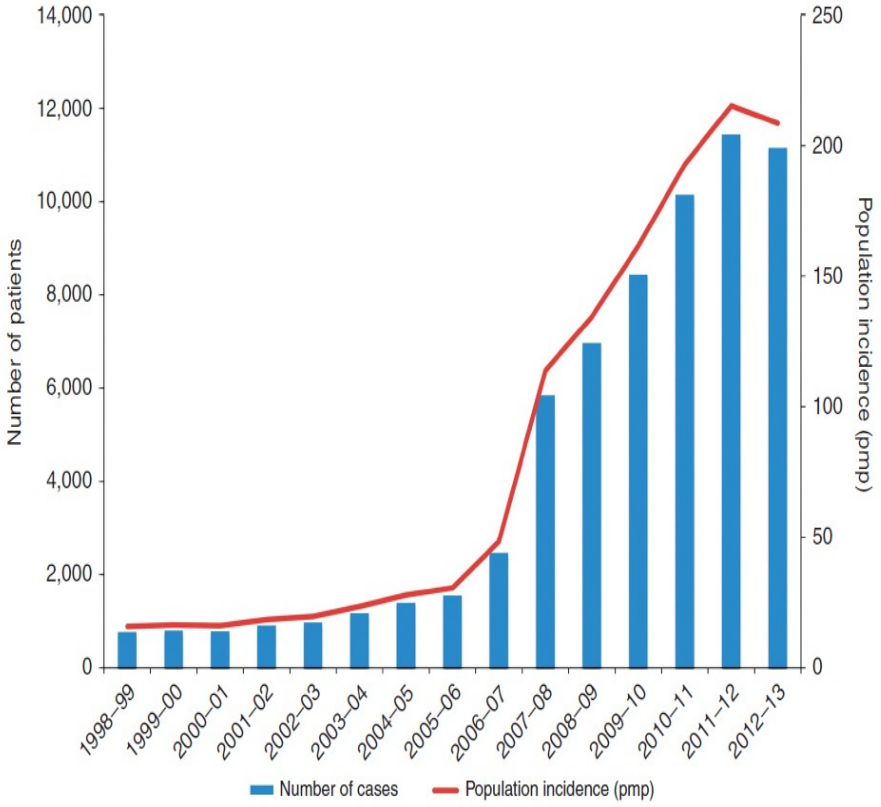
AKI is a frequent complication in patients admitted to the ICU and is associated with adverse outcomes including **increased lenght of ICU and hospital stay**, and **increased short- and long-term mortality risk**.

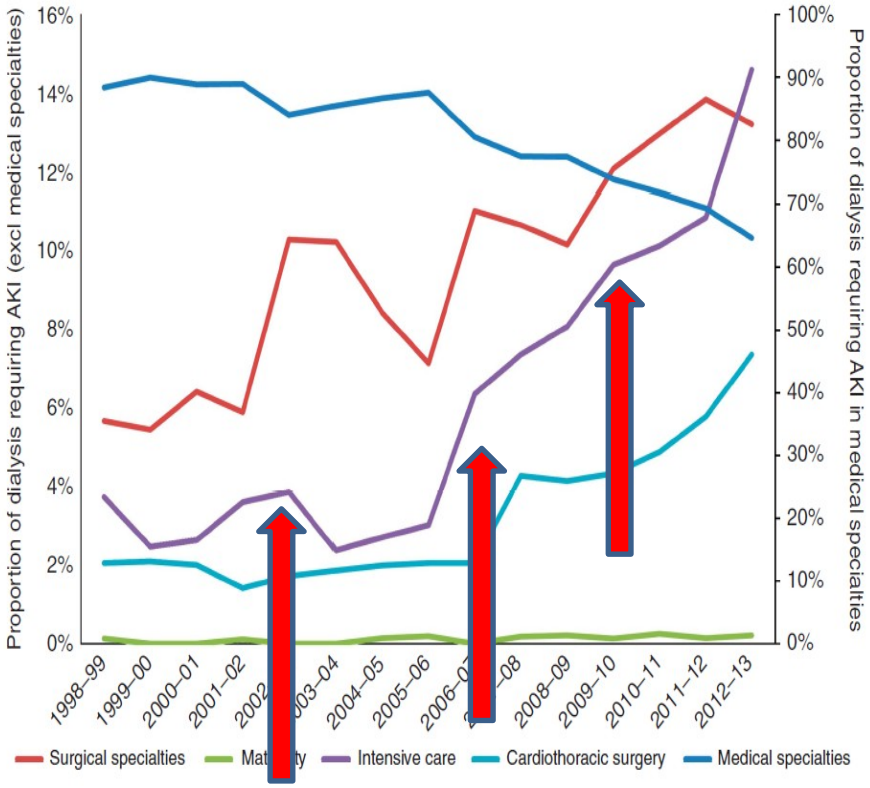
The detrimental effects of AKI are not limited to classical well-known symptoms such as **fluid overload** and **electrolyte abnomalities**; AKI can also cause problems that are not readily appreciated at the bedside and can extend well beyond ICU stay.

National trends in acute kidney injury requiring dialysis in England between 1998 and 2013

Nitin V. Kolhe[1], Andrew W. Muirhead[2], Sally R. Wilkes[3], Richard J. Fluck[1] and Maarten W. Taal[1,4]

Kidney International (2015) **88**, 1161–1169





Quando dializzare?

KDIGO Clinical Practice Guideline for Acute Kidney Injury

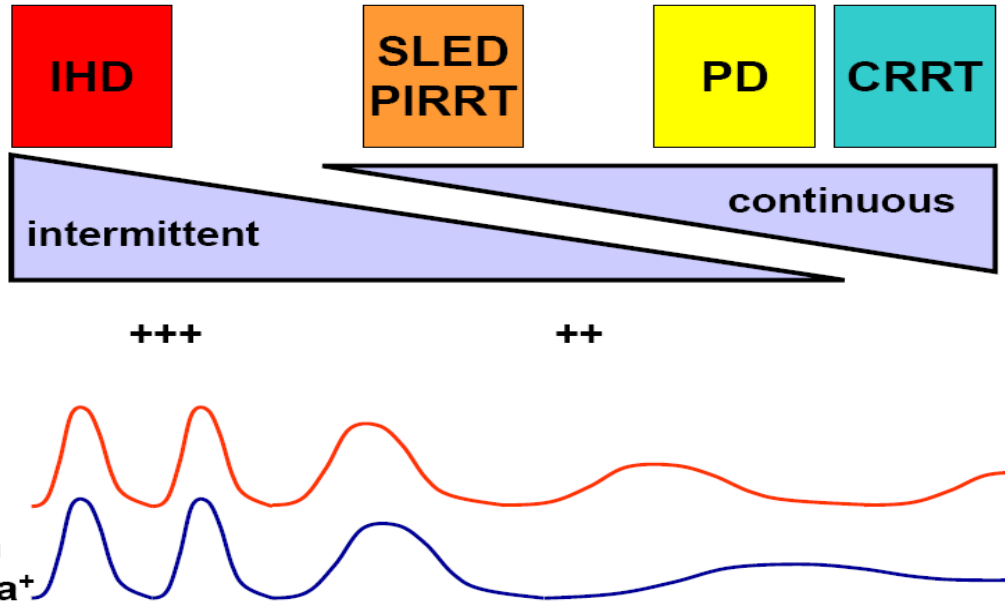
5.1.1: Initiate RRT emergently when life-threatening changes in fluid, electrolyte, and acid-base balance exist. (*Not Graded*)

5.1.2: Consider the broader clinical context, the presence of conditions that can be modified with RRT, and trends of laboratory tests—rather than single BUN and creatinine thresholds alone—when making the decision to start RRT. (*Not Graded*)

"Classic" Indications for RRT initiation

Oligo-anuria	Urine out-put <200 mL/12 hr or anuria
Azotemia	Urea >36 mmol/L or uremic organ complications
Hyperkaliemia	K+ >6.5 mmol/L, rapidly rising and/or ECG abnormalities
Metabolic acidosis	pH <7.15
Sodium disorders	Severe and/or uncontrolled hypo/hypernatremia
Thermoregulation	Hyperthermia (>39.5°C) and/or hypotermia
Volume overload	Significant diuretic-resistant organ edema
Overdose	Drug overdose with dialyzable toxin

Come dializzare?



KDIGO Clinical Practice Guideline for Acute Kidney Injury

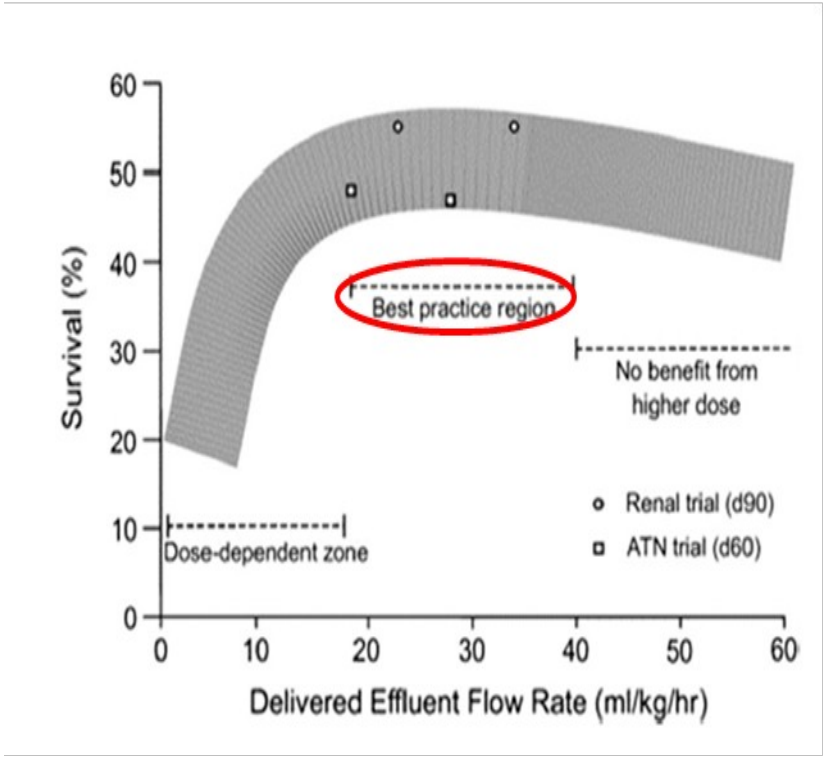
5.6.1: Use continuous and intermittent RRT as complementary therapies in AKI patients. (*Not Graded*)

5.6.2: We suggest using CRRT, rather than standard intermittent RRT, for hemodynamically unstable patients. (*2B*)

5.6.3: We suggest using CRRT, rather than intermittent RRT, for AKI patients with acute brain injury or other causes of increased intracranial pressure or generalized brain edema. (*2B*)

CRRT, IHD and SLED are **complementary modalities**, and their use is based on individual patient condition, availability of nursing staff, equipment, and other resources. Multiple modalities can be used on the same patient.

Quanto dializzare?



KDIGO Clinical Practical Guideline fro Acute Kidney Injury

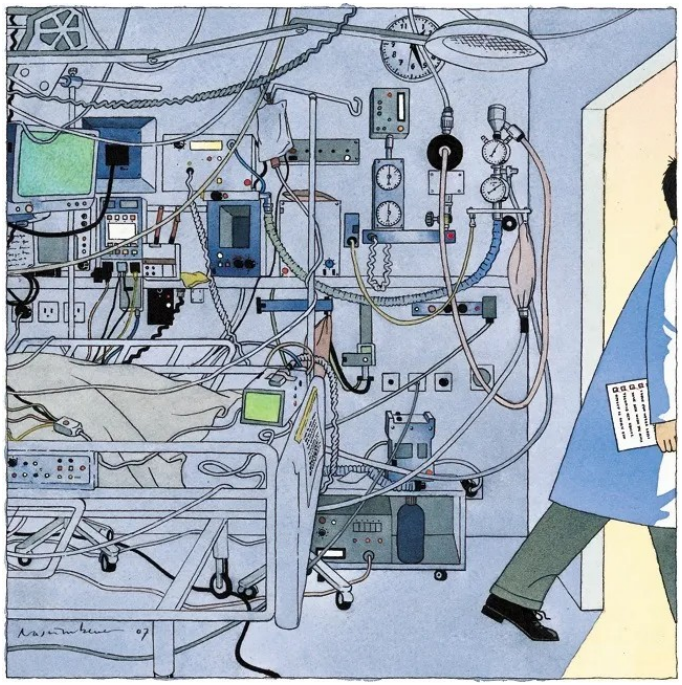
Chapter 5.8: Dose of renal replacement therapy in AKI

5.8.3: We recommend delivering a Kt/V of 3.9 per week when using intermittent or extended RRT in AKI. (*1A*)

5.8.4: We recommend delivering an effluent volume of 20–25 ml/kg/h for CRRT in AKI (*1A*). This will usually require a higher prescription of effluent volume. (*Not Graded*)

The prescribed dose based on the effluent rate should be incremented by 20% to 25%, anticipanting temporary disconnections that decrease treatment time and loss of filter efficacy during the course of CRRT.

Paziente con AKI in Terapia Intensiva



- Elevata comorbidità acuta (instabilità emodinamica, insufficienza respiratoria, sepsi, etc.)
- Elevata comorbidità cronica (CKD, cardiopatia, vasculopatia, BPCO, etc.)
- Elevata necessità assistenziale
- Elevata mortalità

- AVVIO PRECOCE DI RRT
- PREFERIBILMENTE CRRT
- MANTENIMENTO DI UNA ADEGUATA DOSE DIALITICA (25 ml/Kg/h)
- ATTENTA E FREQUENTE (RI)VALUTAZIONE DEI VOLUMI
- ATTENTA VALUTAZIONE DELLA STRATEGIA ANTICOAGULANTE
- ADEGUATA SCELTA DI METODICA DIALITICA (DIFFUSIONE, CONVEZIONE, ADSORBIMENTO)

Paziente con AKI in Terapia Intensiva

Popolazione estremamente vulnerabile con continua necessità di un approccio terapeutico **organizzato** e **specializzato**.

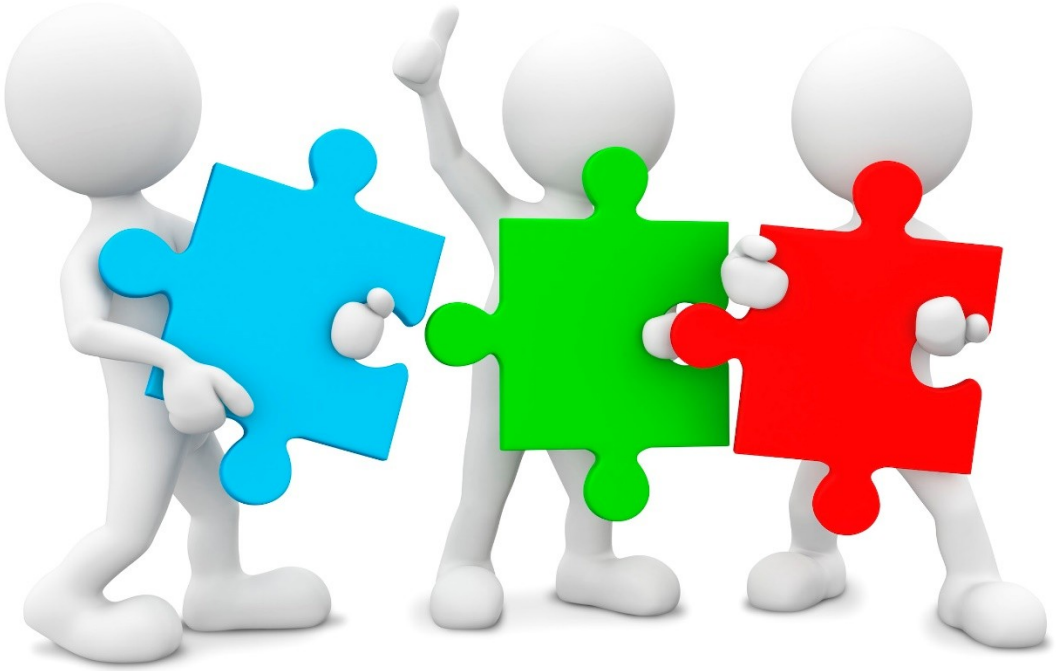
Three models of care delivery for the CRRT patient in a critical care unit

Critical Care team with full responsibility for the therapy

Nephrology and Dialysis team with full responsibility for the therapy

Collaboration between the Critical Care and Nephrology and Dialysis teams

Three models of care delivery for the CRRT patient in a critical care unit



Collaboration between the Critical Care and Nephrology and Dialysis teams

Who should manage continuous renal replacement in the intensive care setting? A nursing viewpoint

R. K. Martin
University of California, San Diego, USA
EDTNA | ERCA JOURNAL 2002 Supplement 2

COMPARISON OF NURSING EXPERTISE IN CRRT

Area of expertise	Critical care	Nephrology
Haemodynamic monitoring	+++++	++
Monitoring CRRT system performance	+ or –	+++++
Evaluating response to all therapies	+++++	+
Evaluating renal function/ response to CRRT	+++	++++
Technical aspects of CRRT	+ to +++	++++

Nephrology nursing support only

Advantages	Disadvantages
Strong understanding of the principles and technical aspects of CRRT	Two nurses are not required to do hourly system maintenance
Nurses are experienced/ nationally certified in renal replacement therapies	Most nephrology services cannot commit to 24 hour/day support
Tend to keep current on the advances and changes in CRRT	Possible role conflict with critical care nurses
Provides a second caregiver at the bedside	Two bedside caregivers is not cost-effective

Critical care nursing support only

Advantages	Disadvantages
Possibly less delays in initiation	Can add to the burden of the bedside nurse in an already stressful environment
Can perform real time evaluation and replacement of intravascular fluids	Must have adequate number of cases, educated nurses, staffing, and resources to maintain a high level of expertise
Eliminates role conflict issues	Possible changes in staffing ratios are not cost-effective

Development, implementation and outcomes of a quality assurance system for the provision of continuous renal replacement therapy in the intensive care unit

Eloy F. Ruiz[1], Victor M. Ortiz-Soriano[1], Monica Talbott[1], Bryan A. Klein[1], Melissa L. Thompson Bastin[2], Kirby P. Mayer[3], Emily B. Price[1], Robert Dorfman[1], Brandi N. Adams[1], Lisa Fryman[1], Javier A. Neyra[1]✉ on behalf of The University of Kentucky CRRT Quality Assurance Group*

Scientific Reports | (2020) 10:20616

Study carried out at the University of Kentucky Medical Center between September 2016 and June 2019.

They implemented a quality assurance system using a step-wise approach based on the **(a)** assembly of a multidisciplinary team, **(b)** standardization of the CRRT protocol, **(c)** creation of electronic CRRT flowsheet, **(d)** selection, monitoring, and reporting of quality metrics of CRRT deliverables, and **(e)** enhancement of education.

Figure 3. Study periods and phases of quality improvement interventions. *CRRT* continuous renal replacement therapy.

Phase I: Team development and protocol standardization (March 2017–May 2017)	
(a) Assembly of a multidisciplinary team	Nephrologists, intensivists, ICU nurses, pharmacists, dieticians, physical therapists, technicians, bioinformaticians, ICU managers, supply chain, management and administration personnel
(b) Standardization of the CRRT protocol tailoring institutional logistics and needs	CVVHDF modality, RCA protocol (anticoagulant citrate dextrose form A), customized order set (prescription entry) in the EHR; use of a non-tunneled temporary dialysis catheter (15–20 cm long, 12–13 French) in the right internal jugular as the preferred CRRT vascular access site
Phase II: Systematic tracking of CRRT deliverables (June 2017–September 2017)	
(c) Creation of electronic CRRT flowsheets	Automated data extraction from the intakes and outputs flowsheet, automated transfer of machine data (e.g. fluid removal, machine pressures) and embedded calculations for suggested hourly fluid removal according to prescription
(d) Selection, monitoring and reporting of CRRT QI metrics	Ten QI metrics under 2 domains (structure and process) and 3 subdomains (provider, prescription and performance). Economic savings was also included as a QI metric
Phase III: Training and teaching (October 2017–December 2017)	
(e) Enhancement of education to clinicians and ICU nurses	*ICU nurse education* New user education (eighteen 4-h sessions per year) on CRRT prescription, protocols and technical aspects of the machine including circuit and filter setup, alarms management, electronic CRRT charting, among others Super user education (six 5-h sessions per year) on CRRT deliverables and in-depth review of the CRRT machine, protocols and QI activities Validator education (twelve 1-h sessions per year) on skills to verify CRRT competency of other ICU nurses *Clinician education* Tailored for residents, fellows and Faculty. Two introductory sessions and four advanced sessions per year

Table 3. Summary of the three CRRT quality improvement intervention phases. *CRRT* continuous renal replacement therapy, *CVVHDF* continuous veno-venous hemodiafiltration, *EHR* electronic health records, *ICU* intensive care unit, *QI* quality improvement, *RCA* regional citrate anticoagulation.

Characteristics	Total	Before QI interventions	After QI interventions	p-value[a]
Total patients, n (%)	1185	483	702	0.212
AKI	986 (83.2)	394 (81.6)	592 (84.3)	
ESKD	199 (16.8)	89 (18.4)	110 (15.7)	
Age (years), mean ± SD	56.6 ± 14.2	55.9 ± 13.9	57.1 ± 14.4	0.147
Sex, male, n (%)	712 (60.1)	290 (60.0)	422 (60.1)	0.980
Race, n (%)				0.254
White	1087 (91.7)	441 (91.3)	646 (92.0)	
Black	91 (7.7)	41 (8.5)	50 (7.1)	
Other	7 (0.6)	1 (0.2)	6 (0.9)	
Weight (kg), median [IQR]	90.9 [75.0–109.9]	90.8 [71.0–110.0]	91.0 [77.0–109.1]	0.229
Hospital LOS (days), median [IQR]	14.6 [5.7–28.8]	14.0 [6.0–27.9]	15.1 [5.4–29.4]	0.544
ICU LOS (days), median [IQR]	8.9 [3.8–19.2]	8.6 [3.8–15.5]	9.6 [3.9–20.7]	0.072
Mechanical ventilation (days), median [IQR]	4.0 [1.0–8.0]	3.5 [1.0–7.3]	4.0 [1.0–8.0]	0.278
Total CRRT days, median [IQR]	3.1 [1.4–7.0]	3.0 [1.2–6.5]	3.3 [1.6–7.4]	0.086
SOFA score at ICU admission, median [IQR]	12.0 [9.0–14.0]	12.0 [10.0–15.0]	12.0 [9.0–14.0]	0.198
SOFA score at CRRT initiation, median [IQR]	14.0 [11.0–16.0]	13.0 [11.0–15.0]	14.0 [11.0–16.0]	0.476
CCI score, median [IQR]	4.0 [2.0–7.0]	5.0 [3.0–7.0]	4.0 [2.0–6.0]	0.030
Discharge disposition, n (%)				0.167
Alive	507 (42.8)	219 (45.3)	288 (41.0)	
Dead	678 (57.2)	264 (54.7)	414 (59.0)	

Table 1. Patient characteristics before and after implementation of CRRT quality improvement interventions.

CRRT QI metrics	Before QI interventions	After QI interventions			p-value[a]
		Jan–Jun 2018	Jul–Dec 2018	Jan–Jun 2019	
CRRT modality (CVVHDF), %	92.4%	95.1%	96.6%	100.0%	< 0.001
Anticoagulation (RCA), %	No data	23.1%	24.7%	39.5%	< 0.001
Total RCA/RCA-CRRT hours, mean ± SD	No data	0.62 ± 0.30	0.68 ± 0.27	0.73 ± 0.26	0.004
Delivered effluent dose (ml/kg/h), mean ± SD	30.50 ± 4.18	27.67 ± 2.07	28.17 ± 1.83	30.33 ± 3.14	0.939
Delivered/prescribed effluent dose, mean ± SD	0.88 ± 0.07	0.88 ± 0.02	0.88 ± 0.01	0.90 ± 0.02	0.487
Filter life span (hours), mean ± SD	26.00 ± 3.16	30.17 ± 4.96	31.00 ± 2.83	31.17 ± 3.31	0.020
Filters per patient, mean ± SD	3.56 ± 0.78	2.90 ± 0.87	2.75 ± 0.50	2.67 ± 0.64	0.054
CRRT access alarms per treatment day, mean ± SD	2.95 ± 1.02	2.02 ± 0.64	1.63 ± 0.20	1.68 ± 0.50	0.021
Total filter cost per 100-patient (USD) ± SD	80,010 ± 17,519	65,173 ± 19,614	61,744 ± 11,287	59,876 ± 14,292	0.054

Table 2. Selected CRRT metrics before and after implementation of CRRT quality improvement interventions.

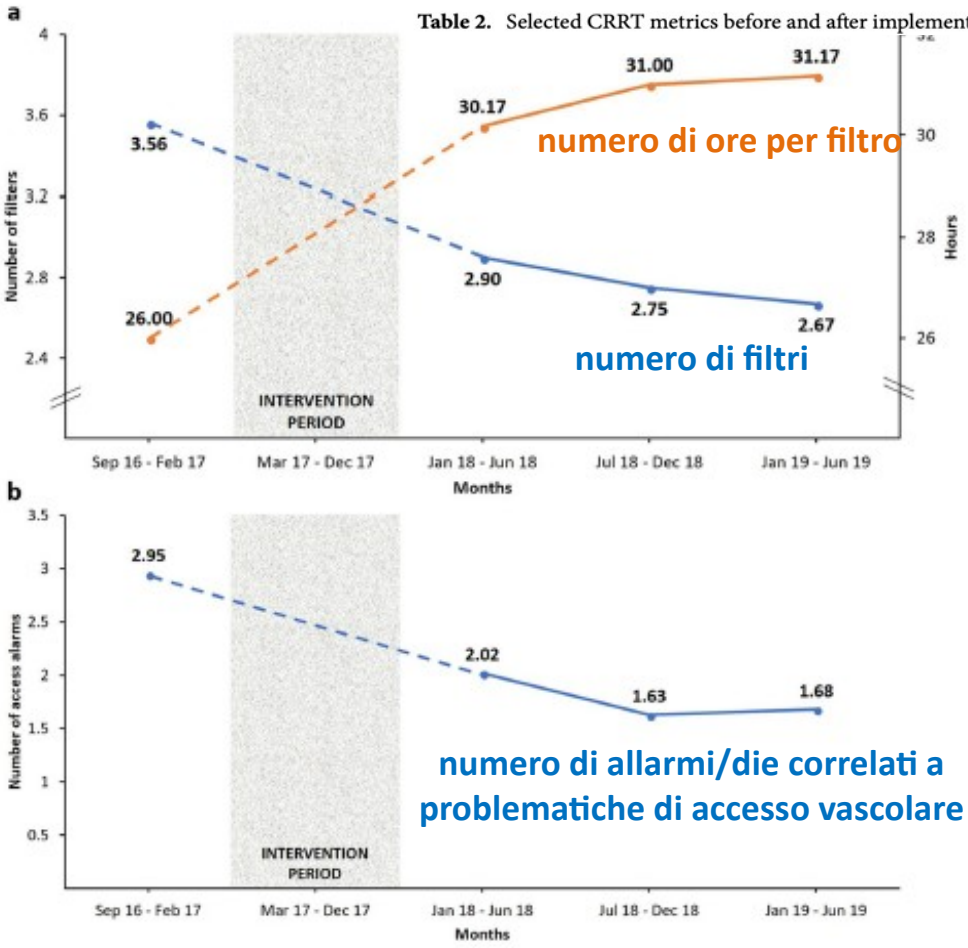


Figure 1. Selected CRRT performance metrics before and after quality improvement interventions: (**a**) mean number of filters used per patient (blue) and mean total hours of filter life (orange); (**b**) mean number of CRRT access alarms per treatment day. *CRRT* continuous renal replacement therapy.

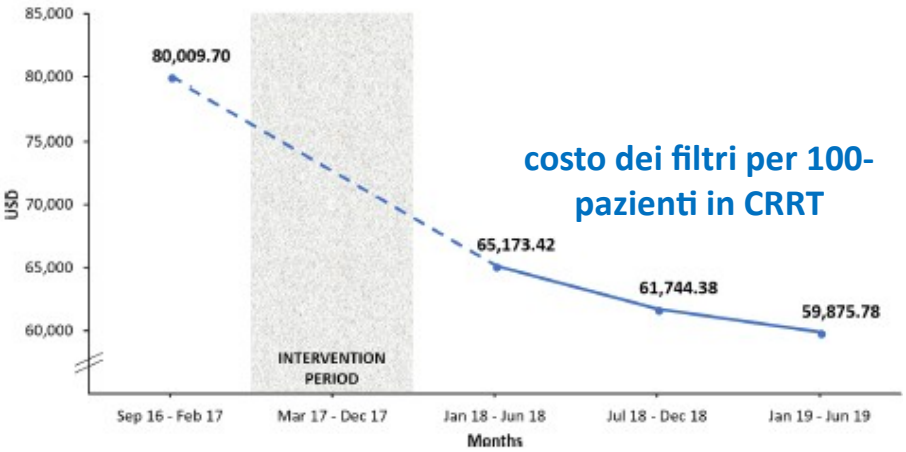


Figure 2. Gross filter cost per 100-patient receiving CRRT before and after quality improvement interventions.

Continuous Renal Replacement Therapy: Reviewing Current Best Practice to Provide High-Quality Extracorporeal Therapy to Critically Ill Patients

Michael J. Connor, Jr. and Nithin Karakala

Adv Chronic Kidney Dis. 2017;24(4):213-218

Table 1. Six Steps for Providing Optimal Acute RRT (CRRT)

1. Close collaboration between CCM and nephrology
2. Define the primary goal of CRRT daily (ie, fluid removal, acid/base control, small solute clearance, etc)
   - Daily goal informs individualized CRRT prescription
3. Keep CRRT running—maximize delivered vs prescribed CRRT ratio
   - Establish and maintain high functioning dialysis vascular access
   - Anticoagulation—regional citrate anticoagulation vs heparin vs other
4. Review appropriateness medication dosing daily (especially antimicrobial agents)
   - Large changes in effluent flow rates should prompt consideration to increase or decrease medication dosing
5. Ensure appropriate nutrition support for CRRT—augmented protein intake recommended
6. Avoid CRRT-related complications
   - Severe hypophosphatemia (ie, <2.0 meq/L)
   - Frequent CRRT circuit failures → increased blood transfusion needs
   - Minimize risk of CRRT therapy errors through standardization and consistency of machine, modality, anticoagulation strategies, and education

Abbreviations: CCM, Critical Care Medicine; CRRT, continuous renal replacement therapy; RRT, renal replacement therapy.

Nursing Issues in Renal Replacement Therapy: Organization, Manpower Assessment, Competency Evaluation and Quality Improvement Processes

Patricia Graham and Eileen Lischer
University of California San Diego Medical Center, San Diego, California

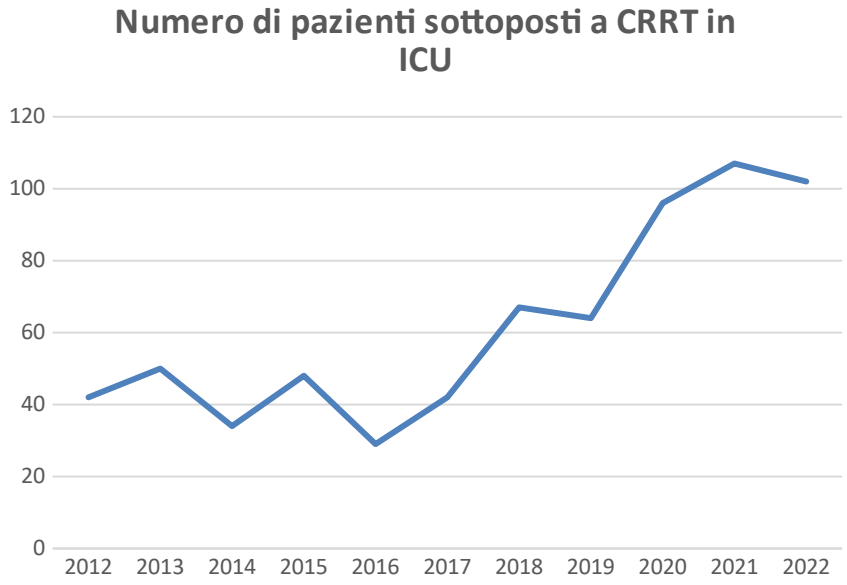
Seminars in Dialysis—Vol 24, No 2 (March–April) 2011
pp. 183–186

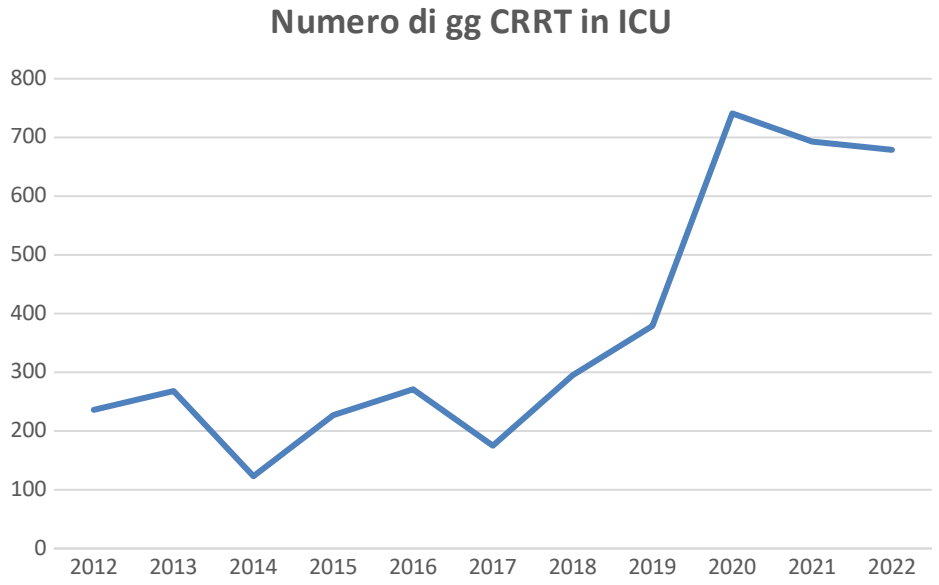
TABLE 1. Didactic continuous renal replacement therapy (CRRT) content

- What is CRRT?
  - Modalities
  - Patient selection
  - Risks and benefits of therapy
  - Initiation and dose for improved outcomes
- Basic principles of dialysis
  - Hemofilter-Solute and fluid dynamics
    - Diffusion
    - Ultrafiltration
    - Convection
    - Absorption
  - Fluid pathways
    - Blood pathway
    - Dialysate
- Basic equipment description
  - Pumps
  - Scales
  - Fluids
  - Safety features
  - Navigating the monitoring screens
  - Identifying and Interpreting pressures
  - Skill-following pathways, move between screens
- Vascular access
  - Policy and procedures for placement and care of access
- Review of order sets and protocols
  - Clearly identify ICU and Nephrology nurse responsibilities
- Initiating therapy
  - Roles and responsibilities
- Anticoagulation
  - Role of citrate
  - Role of calcium chloride
  - Requirements and complications of citrate administration
  - Laboratory value interpretation according to protocols
- Intake and output calculations
- Trouble shooting alarms—hands on skills
  - Identification of fluid pathways
  - Arterial and venous alarms
  - Scale alarms
  - Blood leak alarm
  - Air detector alarm
  - Flushing filter/returning blood—return demonstration required
  - Terminating therapy/emergency disconnect
  - Code Blue protocols
- Final written exam

A.S.L. CN1


SALUZZO
SAVIGLIANO
FOSSANO
BUSCA
CUNEO
MONDOVI
CEVA


Numero di pazienti sottoposti a CRRT in ICU
120
100
80
60
40
20
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022


Numero di gg CRRT in ICU
800
700
600
500
400
300
200
100
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

GESTIONE DELLA TERAPIA SOSTITUTIVA RENALE IN URGENZA IN UTIC E IN RIANIMAZIONE PRESSO L'ASL CN1


INFERMIERE/MEDICO DIALISI
INFERMIERE/MEDICO RIANIMAZIONE/UTIC
COLLABORAZIONE
FARMACIA OSPEDALIERA
PERSONALE OSS

PROCEDURA SPECIFICA

OBIETTIVI

- Definire le attività da svolgere da parte dei professionisti per la gestione della terapia renale sostitutiva in urgenza
- Uniformare i comportamenti dei professionisti
- Tracciare i percorsi operativi

AVVIO E GESTIONE DEL TRATTAMENTO DIALITICO IN URGENZA

Anestesista / Cardiologo → Dopo indicazione nefrologica ad avvio di emodialisi posizionamento CVC temporaneo e verifica del corretto posizionamento tramite indagine radiologica

consulenza nefrologica

Nefrologo → Prescrizione del trattamento dialitico su modulo predisposto

avvio della procedura

Infermiere di dialisi → Avvio trattamento dialitico in collaborazione con il personale infermieristico delle terapie intensive

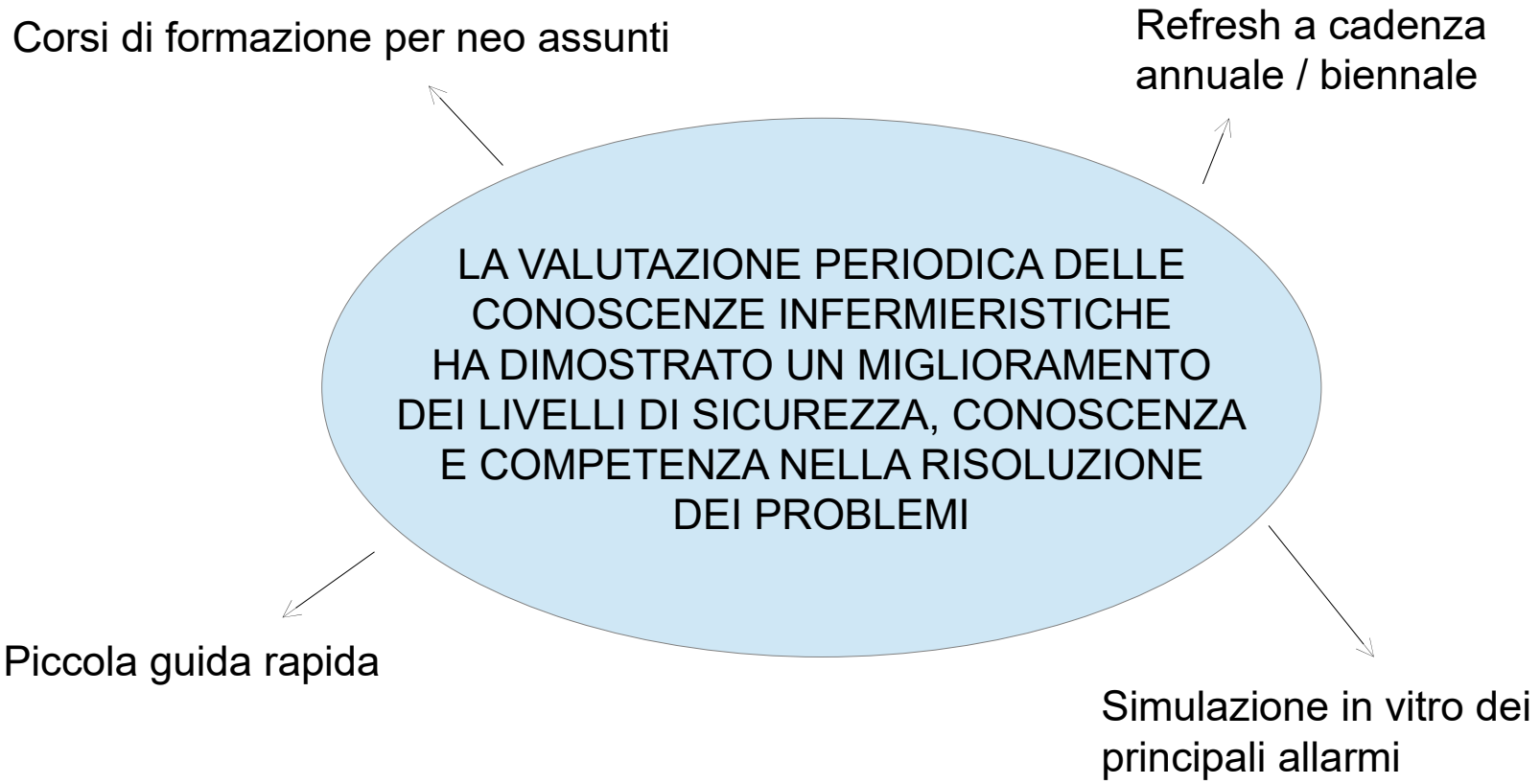
COMPETENZE

Posizionamento del monitor accanto all'utente e preparazione del materiale occorrente	Infermiere rianimazione / UTIC
Montaggio dell'apparecchiatura, connessione dell'utente alla macchina di dialisi, monitoraggio e valutazione dei parametri all'attacco	Infermiere dialisi
1° prelievo da macchina e da paziente per il dosaggio del calcio ionizzato sistemico/calcio ionizzato post filtro	Infermiere dialisi (secondo schema)
Controlli periodici dei parametri del paziente e del circuito secondo prescrizione medica	Infermiere rianimazione (ogni 6 ore) Infermiere UTIC (ogni ora)
Gestione del cambio/svuotamento delle sacche e gestione della terapia anticoagulante	Infermiere rianimazione / UTIC (secondo schema) + medico specialista
Gestione degli allarmi	Infermiere rianimazione / UTIC in collaborazione con l'infermiere della dialisi

COMPETENZE

Attivazione del ricircolo in caso di sospensione temporanea del trattamento	Infermiere della dialisi
Gestione dell'accesso vascolare	Infermiere rianimazione / UTIC
Restituzione ematica in urgenza	Infermiere rianimazione / UTIC
Restituzione ematica allo scadere del trattamento	Infermiere della dialisi
Gestione in caso di decesso dell'utente	Infermiere rianimazione / UTIC
Sanitizzazione del monitor a fine trattamento	OSS, infermiere rianimazione / UTIC
Esecuzione test di funzionalità del monitor	Infermiere rianimazione / UTIC

FORMAZIONE


Corsi di formazione per neo assunti
Refresh a cadenza annuale / biennale
LA VALUTAZIONE PERIODICA DELLE CONOSCENZE INFERMIERISTICHE HA DIMOSTRATO UN MIGLIORAMENTO DEI LIVELLI DI SICUREZZA, CONOSCENZA E COMPETENZA NELLA RISOLUZIONE DEI PROBLEMI
Piccola guida rapida
Simulazione in vitro dei principali allarmi

GESTIONE DEL MATERIALE

- Magazzino della farmacia ospedaliera

Personale del servizio farmaceutico

- Magazzino delle terapie intensive

OSS DELLA DIALISI CON L'UTILZZO DI UNA CHECK LIST PER IL CONTEGGIO DELLE GIACENZE MINIME

Non arrenderti.
Rischieresti di farlo
un'ora prima
del miracolo.

Proverbio arabo

Grazie per l'attenzione

Allegato 1a

A.S.L. CN1	$MOD_{DIAL}001$ SCHEDA DIALISI ACUTI - PRESCRIZIONE DIALITICA Correlata a **$PS_{DIAL}001$** GESTIONE DELLA TERAPIA SOSTITUTIVA RENALE IN URGENZA IN UTIC E RIANIMAZIONE ASLCN1	S.C. Nefrologia e Dialisi Data di emissione: 16/10/2013 Rev. 03 di ottobre 2019

Cognome _____Nome_____ Data di nascita___/___/___

Data___/___/___ Diagnosi_____

Accesso Venoso: FAV ☐ CVC ☐

Chiusura CVC con citrato 3.8% ramo arterioso ml_____; ramo venoso ml_____

Flusso sangue ml/min_____ Perdita peso _____ Dialisato ml/h_____

EGA ogni_____/h Durata seduta _____

Firma Medico _____

Firma infermiere: Attacco_____ Stacco_____

Allegato 1b

A.S.L. CN1	$MOD_{DIAL}023$ SCHEDA DIALISI ACUTI PRESCRIZIONE DIALITICA "CVVHDF" CON EPARINA Correlata a **$PS_{DIAL}001$** GESTIONE DELLA TERAPIA SOSTITUTIVA RENALE IN URGENZA IN UTIC E RIANIMAZIONE ASLCN1	Struttura: SC Nefrologia e Dialisi Data di emissione: Aprile 2020 Revisione n. 00

Cognome _____Nome_____ Data di nascita___/___/___

Data_____/_____/_____ Diagnosi_____

Accesso Venoso: FAV ☐ CVC ☐

Chiusura CVC con citrato 3.8% ramo arterioso ml_____; ramo venoso ml_____

Flusso sangue ml/min_____ Perdita peso_____

Dialisato ml/h_____ Reinfusione ml/h ☐PRE_____ ☐POST_____

EPARINA ml/h _____ Bolo iniziale ml _____

Durata seduta _____

Firma Medico _____

Firma Infermiere _____

Note: _____

Allegato 2

CALCIO IONIZZATO SISTEMICO (mmol/l)	**Modifica dose Calcio (Infusione Ca per litro filtrato)** Prelievo periferico-Rif.Tabella Fresenius Medical Care	**CALCIO IONIZZATO POST-FILTRO (mmol/l)**	**Modifica dose Citrato (Infusione Citrato per litro sangue)** Prelievo port venoso-Rif.Tabella Fresenius Medical Care
>1.35	Riduzione di 0.4 mmol/l e informare il medico	>0.40	Aumento di 0.2 mmol/l e informare il medico
1.21-1.35	Riduzione di 0.2 mmol/l	0.35-0.40	Aumento di 0.1 mmol/l
1.12-1.20	Nessuna modifica (obiettivo tipico)	0.25-0.34	Nessuna modifica (obiettivo tipico)
1.00-1.11	Aumento di 0.2 mmol/l	0.20-0.24	Riduzione di 0.1 mmol/l
<1.00	Aumento di 0.4 mmol/l e informare il medico	<0.20	Riduzione di 0.2 mmol/l e informare il medico

Allegato 3

DATA																
ORA																
Flus. San.																
Dialisato																
Dose Citrato																
Dose Calcio																
Perd. peso																
P. ART.																
P. VEN.																
preF																
PAO																
FC																
Funzionalità accesso vascolare	☐ si	☐ no	☐ si	☐ no	☐ si	☐ no	☐ si	☐ no	☐ si	☐ no	☐ si	☐ no	☐ si	☐ no	☐ si	☐ no
NOTE																

Allegato 4a

MULTIFILTRATE PRO (monitor dialitico) – GESTIONE BASE

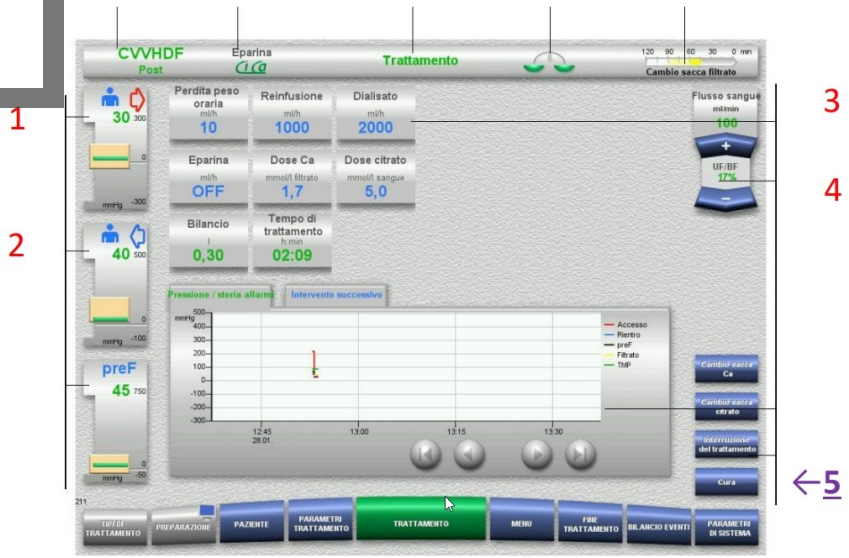


Figura 1 SCHERMATA PRINCIPALE MONITOR

1 – pressione di accesso (arteriosa rossa)

2 – pressione di rientro (venosa blu)

3 – parametri di trattamento (*perdita peso oraria, dialisato, dose Calcio, dose Citrato)*

4 – flusso sangue

5 – tasto “cura” (attivarlo se si eseguono manovre assistenziali/movimentazioni al paziente)

Allegato 4b

CAMBIO SACCHE CI-CA (4 sacche dialisato, bilance 1+2)

Le 4 sacche sono nelle bilance 1+2

Figura 2 VISTA POSTERIORE DEL MONITOR

MENU

↓

CAMBIO SACCA

↓

CHIUEDERE LE 4 CLAMP VERDI

↓

SOSTITUIRE LE 4 SACCHE MISCELANDOLE

(schiacciare angolo sacca)

↓

SPEZZARE I CONI DEI RACCORDI SACCA

↓

RIAPRIRE LE 4 CLAMP VERDI

↓

FINE

Figura 3 SCHERMATA CAMBIO SACCA

Allegato 4c

CAMBIO SACCA CITRATO (sacca da 1,5 litri)

MENU

↓

CAMBIO SACCA CITRATO

↓

CHIUDERE LA PICCOLA CLAMP VERDE

↓

SOSTITUIRE LA SACCA

↓

SPEZZARE IL CONO DEL RACCORDO SACCA

↓

RIAPRIRE LA PICCOLA CLAMP VERDE

↓

FINE

La sacca è appesa a sinistra dello schermo

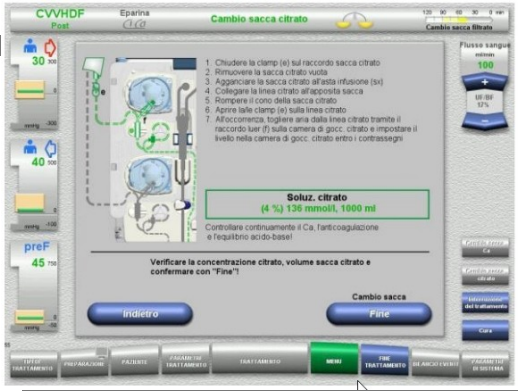


Figura 5 SCHERMATA CAMBIO SACCA CITRATO

Allegato 4d

ALLARME PRESSIONE DI ACCESSO (ramo arterioso, rosso del circuito sangue)

Valore negativo di aspirazione sangue fuori range:

- Catetere o linea sangue piegati/clampati/ostruiti? **VERIFICARE!**
- Premere ***CONFERMA*** il prima possibile per resettare l'allarme poi ***OK***

Se l'allarme non scompare:

- Premere ***RIDUCI***
- Premere ***CONFERMA***

Aspettare che la macchina riduca la pressione (**NON** PREMERE INTERROMPI), **VERIFICARE** che catetere o linea sangue non siano piegati/clampati/ostruiti.

Se l'allarme non scompare: invertire i rami del CVC (descrizione nella pagina seguente).

Le finestre di allarme pressorio fermano la circolazione del sangue nel circuito facendolo coagulare: resettarle immediatamente o il circuito ed il sangue andranno persi.

Allegato 4e

INVERSIONE DEI RAMI DEL CVC

*Ripetuti allarmi di **PRESSIONE DI ACCESSO** o **PRESSIONE DI RIENTRO** possono rendere necessaria l'inversione dei rami del CVC (arterioso e venoso).*

Fermare la pompa sangue premendo il TASTO ROSSO,
SECONDO DA SINISTRA SUL BORDO INFERIORE DELLO SCHERMO

Figura 8 TASTO ARRESTO POMPA SANGUE

CLAMPARE CVC E LINEE SANGUE

(4 clamp totali)

↓

SCOLLEGARE ED INVERTIRE LA CONNESSIONE SUL CVC

(Rosso con Blu ↔ Blu con Rosso)

↓

SCLAMPARE CVC E LINEE SANGUE

↓

AZIONARE IL TASTO VERDE DI AVVIO POMPA (A DESTRA DI QUELLO ROSSO) PER RIAVVIARE IL CIRCUITO


GESTIONE DEL MATERIALE

Magazzino della farmacia ospedaliera

Magazzino delle terapie intensive