«Estratègies per reduir el fracàs renal agut intrahospitalari»

Anna Saurina

Consorci Sanitari de Terrassa

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- Antecedents
- Justificació
- Etiologia i iatrogènia
- Importància d'una avaluació i detecció precoç.
- Mesures de prevenció/ actuació
- Conclusions.

Antecedents

Antecedents

- La primera descripció de IRA/FRA, amb el terme " ischuria renalis" la va realitzar William Heberden in 1802. (1)
- Durant la primera guerra mundial la síndrome s'anomenà ''war nephritis'', l es va descriure en multiples publicacions. (2)
- Aquesta síndrome va ser oblidada fins la Segona Guerra Mundial on Bywaters and Beall van publicar el famós article sobre el *Crush Syndrome*.(3)
- No obstant va ser Homer W. Smith a qui se li atribueix la introducció del terme ''acute renal failure'', en un capítol de ''Acute renal failure related to traumatic injuries'' en el seu llibre de text: The kidney-structure and function in health and disease (1951).

(1) Eknoyan G. Emergence of the concept of acute renal failure. Am J Nephrol 2002; 22: 225–230
(2) Davies F, Weldon R. A contribution to the study of ''war nephritis''. Lancet 1917; ii: 118–120.
(3) Bywaters EGL, Beall D. Crush injuries with impairment of renal function. BMJ 1947; 1: 427–432.

Antecedents

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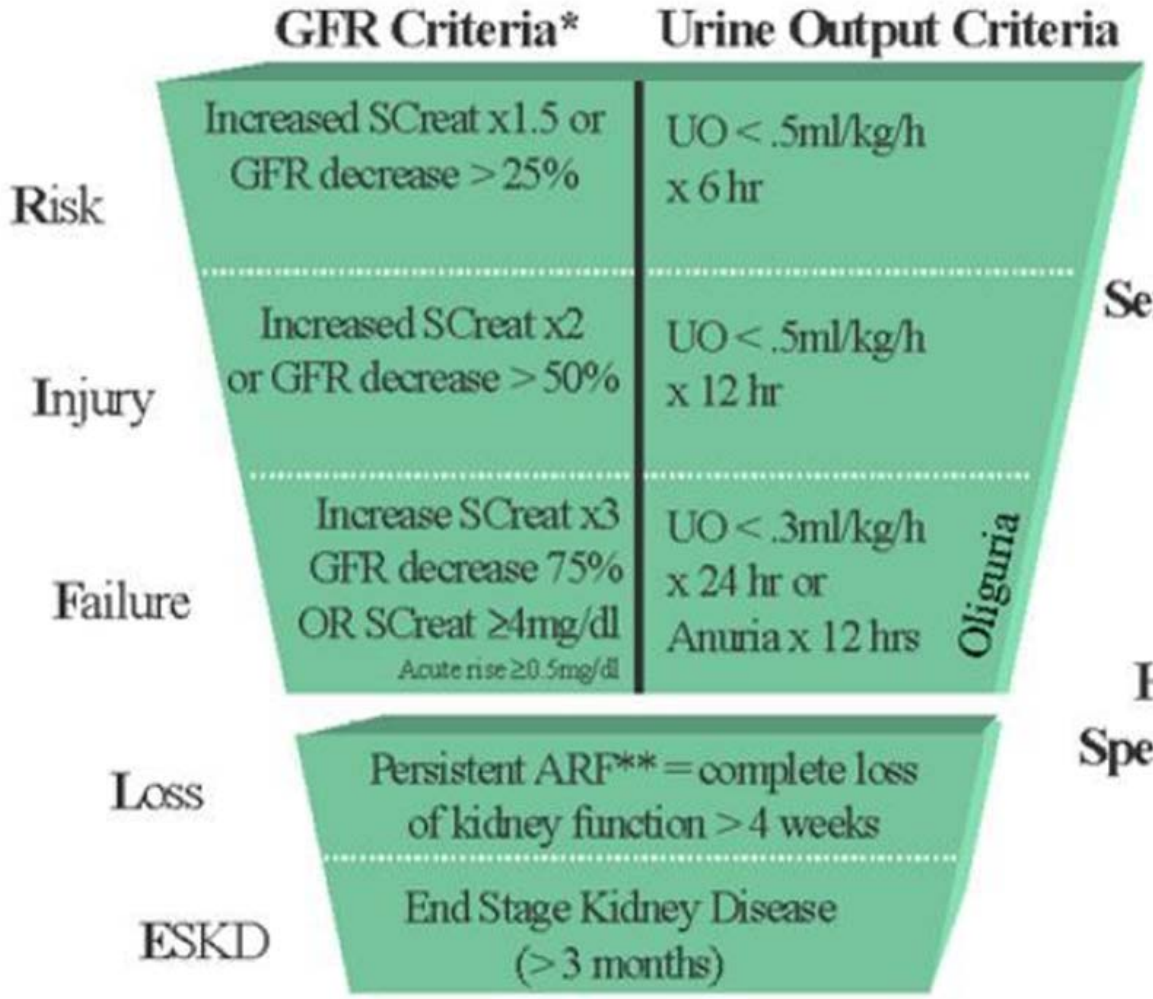
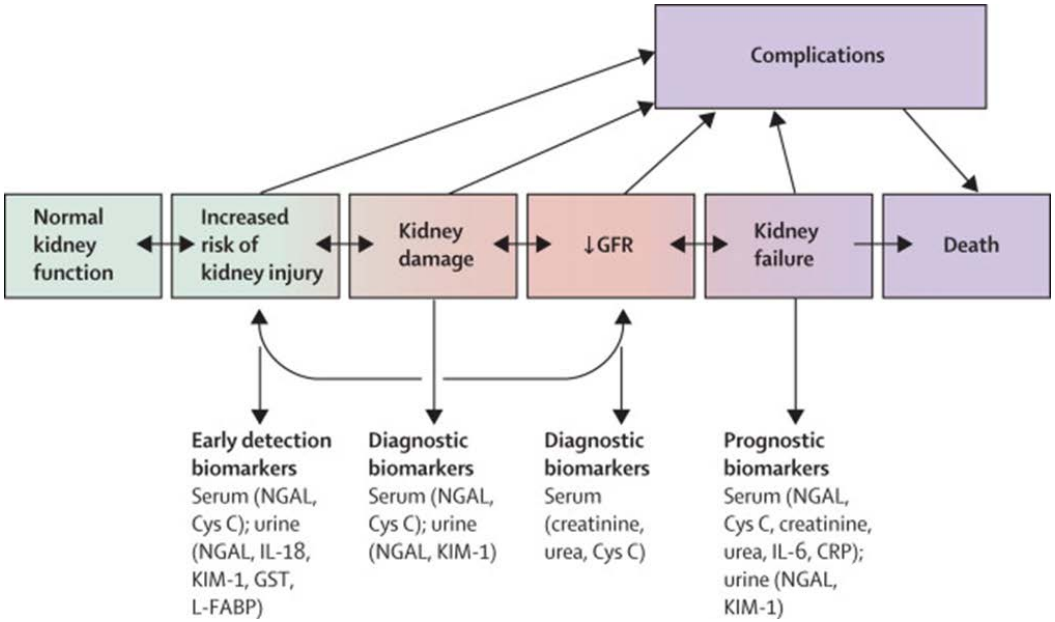


Bellomo et al. Critical Care 2004, **8**:R204-R212

Antecedents/ Definició

- Procès progressiu i reversible, produit per causes hemodinàmiques o tòxiques, que abarca des del desenvolupament de lesions subletals de les cèl.lules renals (identificables per biomarcadors (fase de lesió renal aguda) al dany estructural caracteritzat per necroapoptosi de les cèl.lules tubulars (necrosi tubular aguda) i en la que es constata elevació de la creatinina sèrica i per descens de la tassa de filtrat glomerular.



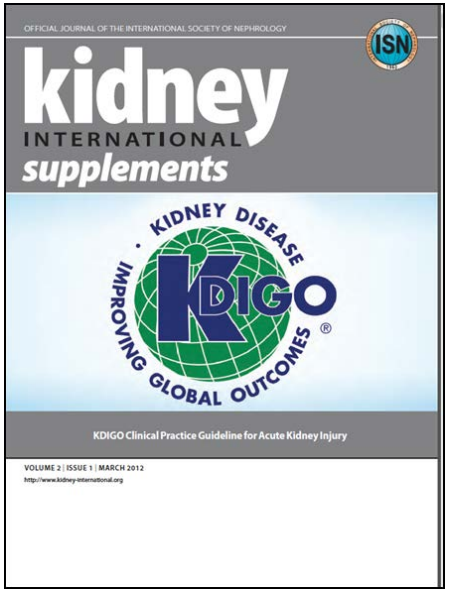
Mehta et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Crit Care 2007; 11: R31

Antecedents/Definició

2.1.1: AKI is defined as any of the following (*Not Graded*):

- Increase in SCr by $\geqslant 0.3$ mg/dl ($\geqslant 26.5$ µmol/l) within 48 hours; or
- Increase in SCr to $\geqslant 1.5$ times baseline, which is known or presumed to have occurred within the prior 7 days; or
- Urine volume < 0.5 ml/kg/h for 6 hours.

2.1.2: AKI is staged for severity according to the following criteria (Table 2). (*Not Graded*)



Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Group. KDIGO Clinical Practice Guideline for Acute Kidney Injury. *Kidney Inter.*, Suppl. 2012;**2**:1-138

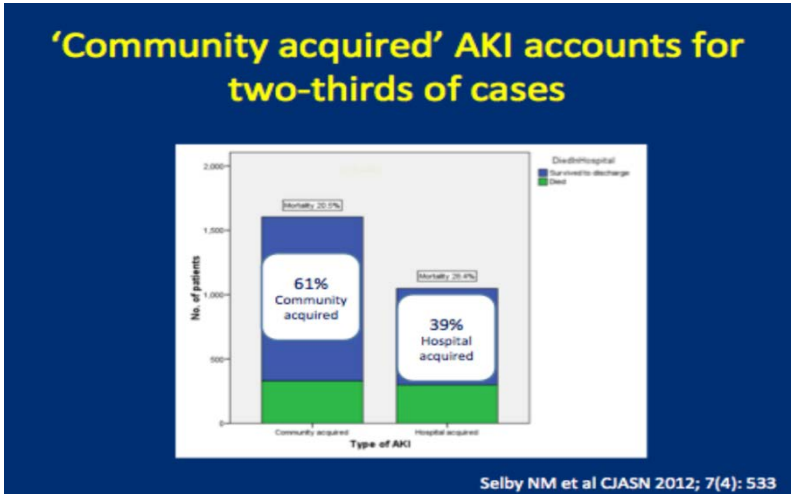
Kidney Disease Improving Global Outcomes (KDIGO) staging classification for AKI

Kidney Disease Improving Global Outcomes (KDIGO) staging classification for AKI		
Stage	Serum creatinine (Scr) criteria	Urine output criteria
1	Rise in Scr of 26 umol/L within 48 hrs Increase of 1.5 – 1.9 x baseline Scr within past 7 days	< 0.5 mL/Kg/hr for > 6 consecutive hours
2	Increase of 2 - 2.9 x baseline Scr	< 0.5 mL/Kg/hr for > 12 consecutive hours
3	Increase of 3 x baseline Scr or Scr ≥ 354 umol/L or Commenced on dialysis	
Additional RIFLE Criteria reflecting outcome of AKI		
Loss	Need for ongoing dialysis for > 4 weeks	
Failure	Need for ongoing dialysis for > 3 months	

Justificació

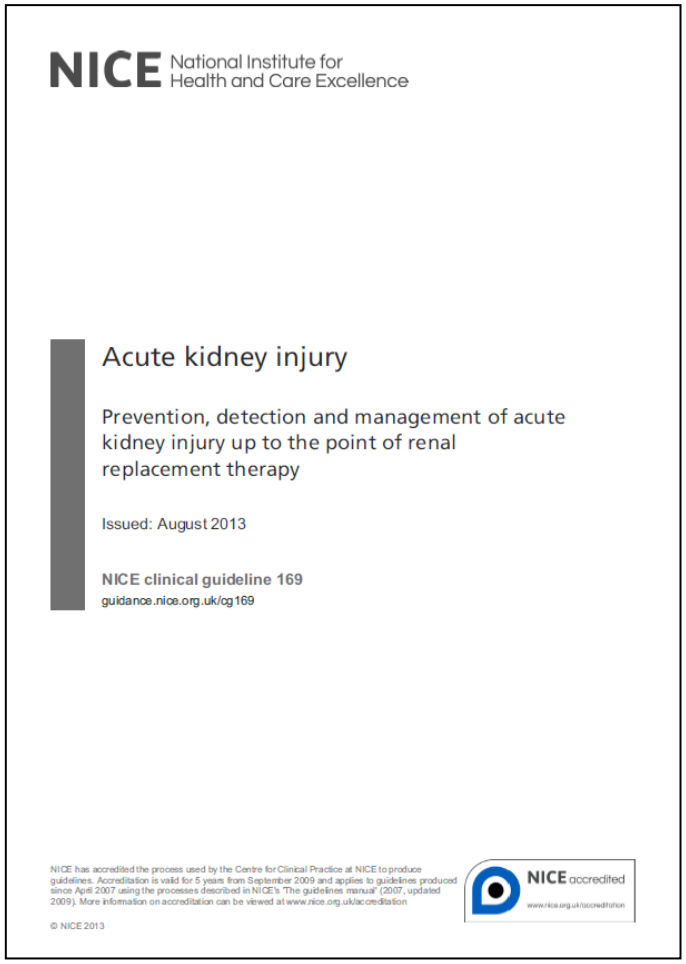
Justificació

- Existeixen poques dades (i molt variable) sobre la incidència real del FRA, ja sigui comunitari com nosocomial.
- L'any 2013, la NICE (National Institute for Health and Care Excellence) estima el FRA en un 13-18% del pacients que ingressen a l'hospital)
- Un estudi recent reporta un incidència de fins el 25 % de les admissions mèdiques, de les quals 2/3 parts va inicar-se abans de l'ingrés .
  (BMC Nephrology, 2014, 15:84)



El FRA és una entitat freqüent que s'associa a una **alta morbilitat**, comporta un increment de **depesa econòmica** tant en en seu maneig, com amb l'increment en els dies d'estada hospitalaria i alhora és un **factor de risc independent de mortalitat.**

Justificació



- El pacients ingressats afectes de FRA comporten una major despesa i cost dels recursos de salut.
- La NHS (National Health Service) estima un cost anuals entre 434 i 620 mil.lions de £. Aquest cost supera el cost del Ca de mama, pulmó i pell .
- La mortalitat intrahospitalària de pacients amb FRA varia de forma considerable, depenent de la severitat, ubicació (UCI o no) i molts altres factors relacionats amb el propi pacient, però al Regne Unit pot arribar a ser del 25-30 %.
- Tenint en compte aquesta taxa de mortalitat, la prevenció i milloria de fins un 20 % de les causes de FRA podria prevenir un alt número de morts i reduir substancialment les complicacions i seus costos associats.

Justificació

Clinical Science Articles

Acute Kidney Injury, Mortality, Length of Stay, and Costs in Hospitalized Patients

Glenn M. Chertow,* Elisabeth Burdick,† Melissa Honour,† Joseph V. Bonventre,‡ and David W. Bates†

*Division of Nephrology, Departments of Medicine, Epidemiology, and Biostatistics, University of California San Francisco, San Francisco, California; †Division of General Internal Medicine and ‡Renal Division, Department of Medicine and Harvard-MIT Division of Health Sciences and Technology, Brigham and Women's Hospital, Harvard Medical School, Partners HealthCare System, Boston, Massachusetts

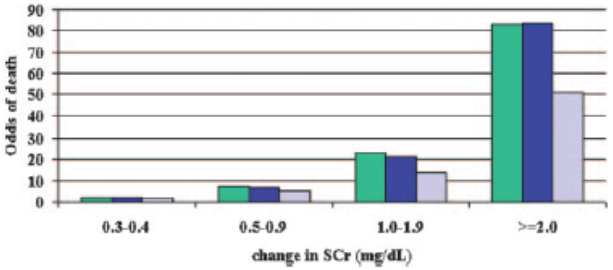


Figure 2. Mortality associated with change in serum creatinine. Green bars are unadjusted, blue bars are age and gender adjusted, and gray bars are multivariable adjusted. Multivariable analyses adjusted for age, gender, diagnosis-related group (DRG) weight, chronic kidney disease (CKD) status, and ICD-9-CM codes for respiratory, gastrointestinal, malignant, and infectious diseases; n = 1564, 885, 246, and 105 for change in SCr 0.3 to 0.4, 0.5 to 0.9, 1.0 to 1.9, and ≥2.0 mg/dl.

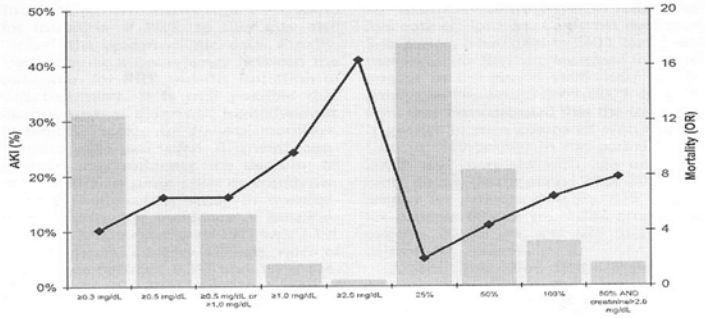


Figure 1. Different definitions of acute kidney injury (*AKI*) and effect on incidence and outcome (5). The same cohort is classified as AKI by nine different definitions, indicated on the *horizontal axis*: absolute increase of serum creatinine of, respectively, ≥0.3 mg/dL, ≥0.5 mg/dL, ≥0.5 mg/dL (when baseline serum creatinine of <2 mg/dL) or ≥1.0 mg/dL (when baseline serum creatinine ≥2.0 mg/dL and <5.0 mg/dL), 1.0 mg/dL, and 2.0 mg/dL, or relative increase of serum creatinine of 25%, 50%, 100%, or 50% to a minimum peak of 2.0 mg/dL. *OR*, odds ratio.

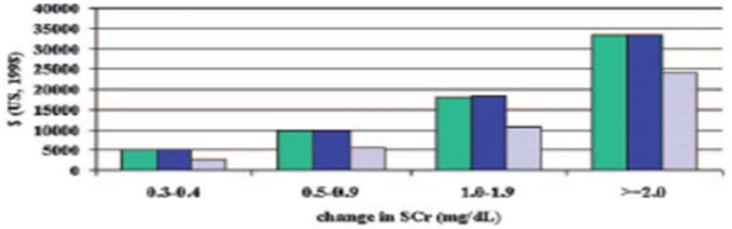


Figure 3. Mean hospital costs associated with changes in SCr. Green bars are unadjusted, blue bars are age and gender adjusted, and gray bars are multivariable adjusted. Multivariable analyses adjusted for age, gender, DRG weight, and ICD-9-CM codes for cardiovascular, respiratory, malignant, and infectious diseases; n = 1564, 885, 246, and 105 for change in SCr 0.3 to 0.4, 0.5 to 0.9, 1.0 to 1.9, and ≥2.0 mg/dl.

Chertow et al. Acute kidney injury, mortality, length of stay, and cost in the hospitalized patients. J Am Soc Nephrol 16: 3365-3370, 2005.

«Estratègies per reduir el fracàs renal agut intrahospitalari»

The long-term outcome after acute kidney injury: a narrative review

Evolução em longo prazo após episódio de lesão renal aguda: revisão narrativa

[c] Momentum-Research, Durham, NC, USA
[d] NovaCardia Inc., San Diego, Ca, USA
[e] Cardiology Division, University of California and the Department of Veterans Affairs Medical Center, San Francisco, Ca, USA

Clin Kidney J (2014) 7: 144–150
doi: 10.1093/ckj/sfu010
Advance Access publication 28 February 2014

Original Article

CKJ

How good are we at managing acute kidney injury in hospital?

Soma Meran*, Alexa Wonnacott*, Bethan Amphlett and Aled Phillips

Servicio de Cardiología. Hospital Clínico Universitario de Santiago de Compostela. La Coruña. España.

Etiologia i iatrogènia

Etiologia de FRA

Causes of AKI

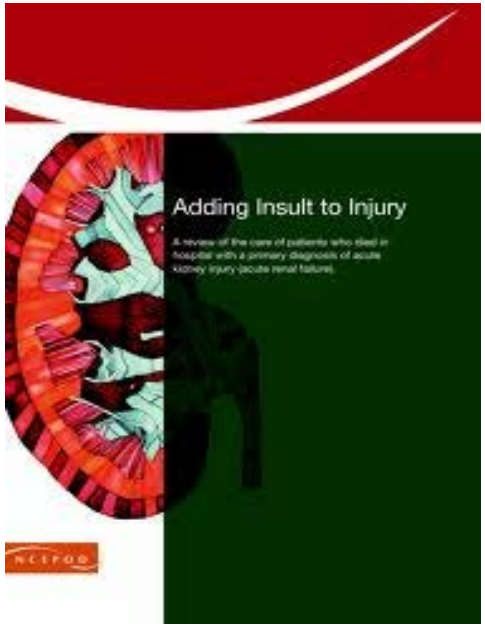
Pre-renal (hypoperfusion)	Intrinsic-renal	Post-renal
Volume depletion • Dehydration • Blood loss Hypotension • Sepsis • Medications • Cardiac failure	Acute Tubular Injury Interstitial nephritis Glomerulonephritis Vasculitis	Bladder outlet obstruction Bilateral ureteric obstruction. Obstruction of a single functioning kidney.

La principal causa de FRA és d'etiologia pre-renal i principalment en situació de deplecció de volum

«Estratègies per reduir el fracàs renal agut intrahospitalari»

- The UK National Confidential Enquiry into Patient Outcome and Death (NCEPOD) van afegir el AKI al **2009.**

- Aquesta revisió examina pacients que van ser éxitus amb el diagnòstic de AKI.



- S'identifiquen moltes deficiències en el maneig d'aquests pacients. Únicament un **50%** d'aquests varen rebre una atenció correcta.

- Identifica que un **60 %** dels episodis de AKI eren "previsibles" en el moment de l'ingrés I fins un **21 %** dels casos eren "evitables".

- La manca d'atenció als detalls, inadequada valoració dels factors de risc de AKI i un retard inacceptable en el reconeixement i correcció d'aquests al ingrés justifiquen aquesta inclusió.

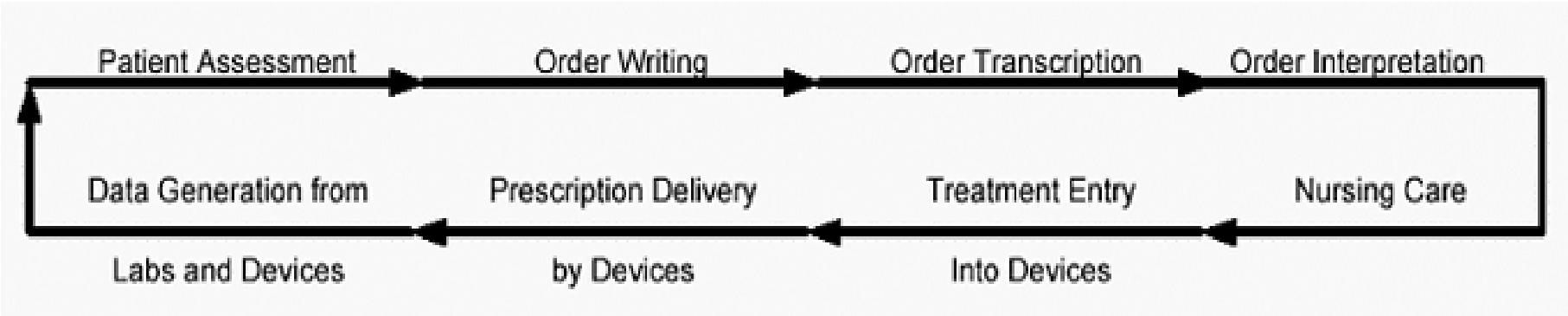
Iatrogènia i FRA

- FRA Iatrogènic: FRA que es produeix directa o indirectament com a conseqüència d'una actuació mèdica (diagnòstica o terapèutica).

- La prevalença del FRA iatrogènic intrahospitalari està infravalorada, principalment per la gran variabilitat en la seva definició i l'escassa bibliografia existent.

- Pot oscil.ar entre un 1-3 % fins a un 6-35.3% segons altres.

Iatrogènia i FRA



The cycle of patient care and sites of potential errors. Any step in this continuous cycle of assessing and caring for a patient can be a site of error, which may lead to patient harm.

Rinaldo Bellomo, Claudio Ronco, John A Kellum, Ravindra L Mehta, Paul Palevsky and the ADQI workgroup. **Acute renal failure – definition, outcome measures, animal models, fluid therapy and information technology needs: the Second International Consensus Conference of the Acute Dialysis Quality Initiative (ADQI) Group.** *Critical Care* 2004, **8**:R204-R212

«Estratègies per reduir el fracàs renal agut intrahospitalari»

- What are the main factors contributing to iatrogenic kidney injury and how can their impact be minimized?

- Iatrogenic AKI is mainly due to insufficient knowledge of and/or attention to:

  (a) the presence of risk factors for nephrotoxicity
  (b) alternative therapies for drugs with potential nephrotoxicity
  (c) appropriate drug dosing adapted to altered kinetics
  (d) the correct assessment of kidney function before and at appropriate intervals during treatment with the aim of early recognition of kidney injury and
  (e) preventive measures for nephrotoxicity (general and specific).

Education, vigilance and early intervention are therefore the major avenues for prevention of iatrogenic kidney injury.

ADQI

Acute Dialysis Quality Initiative

4th International Consensus Conference

Workgroup 3

Preventing/Minimizing iatrogenic acute kidney injury

«Estratègies per reduir el fracàs renal agut intrahospitalari»

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Article in Press

Physician Prevention of Acute Kidney Injury

Hala Yamout, MD[1], Murray L. Levin, MD[2], Robert M. Rosa, MD[2], Kevin Myrie, MD[3], Sara Westergaard, MD[4]
Division Of Nephrology/Hypertension, Department Of Medicine, Northwestern University Feinberg School Of Medicine and Northwestern Memorial Hospital, Chicago, Illinois, Usa
1 8025 Bonhomme Ave. APT. 1206, Clayton, MO 63105.
2 Division of Nephrology/Hypertension, Dept. of Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL.
3 Nephrology Associates of Northern Illinois and Indiana, Merrillville, IN.
4 Sutter East Bay MedicaL Foundation, Berkeley, CA.

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Publication stage: In Press Accepted Manuscript

Avaluació de 167 episodis de FRA, dels quals 51 es consideren prevenibles (30,5%).

Cause of preventable Acute Kidney Injury	Number
Contrast-induced nephropathy without volume prophylaxis	16
Hemodynamic Instability	15
Iatrogenic volume depletion/hypotension	4
Inappropriate treatment of volume depletion/hypotension	6
Inappropriate rapid treatment of hypertension	5
Inappropriate medication use	9
Nephrotoxic medications	4
Non-steroidal anti-inflammatory drugs	2
Inappropriate medication dosing	2
Renin-angiotensin system blockade during acute kidney injury	1
Multiple nephrotoxic insults	11
Contrast with nephrotoxic medications	6
Volume depletion/hypotension plus nephrotoxic agent	5

XXIX REUNIÓ ANUAL DE LA SOCIETAT CATALANA DE NEFROLOGIA
Barcelona, 6 i 7 de juny de 2013 Casa Convalescència
I TROBADA DE RESIDENTS DE NEFROLOGIA DE CATALUNYA
5 de juny de 2013 Sala d'Actes (Fundació Puigvert)
SCN SOCIETAT CATALANA DE NEFROLOGIA
Fundació Puigvert

XXIX
REUNIÓ ANUAL DE LA SOCIETAT CATALANA DE NEFROLOGIA

21. FRACÀS RENAL AGUT INTRAHOSPITALARI IATROGÈNIC: RESULTATS DE L'APLICACIÓ D'UN PROTOCOL DE PREVENCIÓ

Anna Saurina, Victòria Pardo, Núria Barba, Esther Jovell, Mònica Pou, Vicent Esteve, Miquel Fulquet, Verònica Duarte, Javier Macías, Fàtima Moreno, José Carneiro, Manel Ramírez de Arellano
Servei de Nefrologia. Hospital de Terrassa. Consorci Sanitari de Terrassa

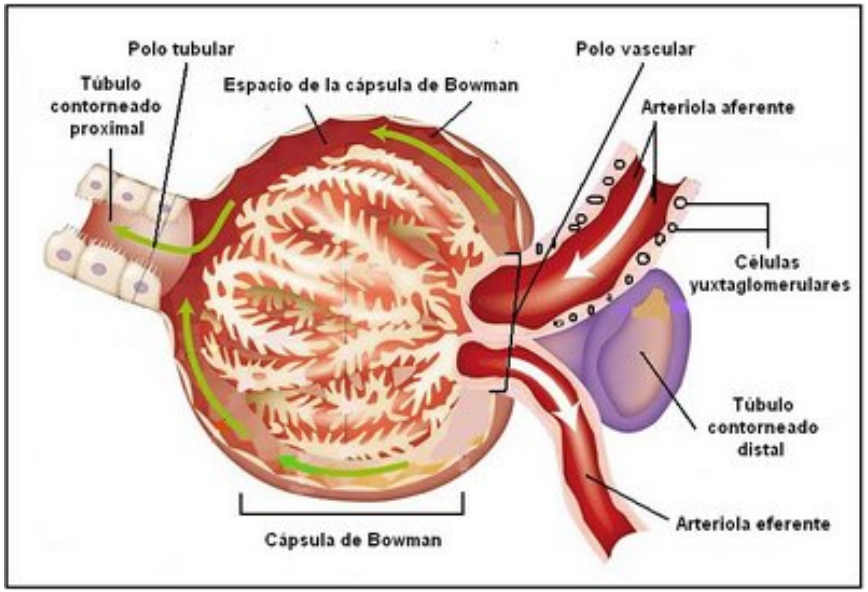
%	Fase I	Fase II	Total	Significació
Iatrogenia	52,1	37	43,4	0,002
Nefrotòxics	21	15,9	18	ns
Retard correccio hemodinàmica	31,1	19,8	24,6	ns
Tract. inapropiats	22,8	20,7	21,6	ns
Temps mig de detecció (dies) A l'ingres (%) Precoç (1-3 d) (%) Tardà (≥4 d) (%)	4,95 47,9 20,4 31,7	3,92 61,2 15 23,8	 55,6 17,3 27,3	ns
Durada del FRA	8,99	5,83		0,0000...
Estada mitja	18,18	13,74	16,93	ns... 0,087

Importància d'una avaluació i detecció precoç.

Fiospatologia renal del FRA pre-renal

- Els ronyons reben un 25 % del cabdal cardíac en repos. Qualsevol afectació d' aquest afecta al fluxe renal.
- Els ronyons filtren 180 L/dia que la majoria es reabsorbeix eliminant "l'excedent" de 1,5-2 L en forma de dïuresi.
- Aquest filtrat depén d'una adequada pressió capilar: equilibri entre una vasodilatació de la AA i una vasocontricció de la AE

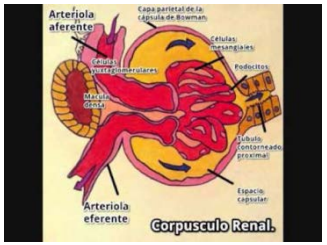
  (Autoregulació renal)



La capacitat per mantenir l' hemodinàmica renal (autoregulació renal) es deteriora quan la PA < 70 mm Hg i es perd quan és ≤ 50 mm Hg.

Fisiopatologia renal del FRA pre-renal

- Una disminució de la perfusió renal secundària a hipotensio, produeix activació del sistema d'autoregulació.



- Hi ha situacions en les que aquest autoregulació pot fallar, inclus en situacions en les que la PAM es mantigui dins la normalitat

Patients at risk of AKI

Age over 65 years
Existing CKD (eGFR < 60 mL/min/1.73m^2), Previous episode(s) of AKI
Co – Morbidity (Cardiac / Liver failure, Diabetes Mellitus
Use of nephrotoxic drugs (Diuretics, ACEi/ARBs, NSAIDs)
Diagnosis of sepsis
Hypovolaemia / Hypotension / Oliguria (< 0.5 mL/kg/hr)
Deteriorating Early Warning Scores
Symptoms / history or condition that may lead to urinary tract obstruction
Use of iodinated contrast agents within the previous week

Ulster Med J 2014;**83(3):**149-157

Importància d'una avaluació precoç en situacions de risc

Causes of Renal Hypoperfusion

Hypovolaemia • Extrinsic fluid loss (gastrointestinal, renal losses (e.g. diuretics), skin losses
Cardiac causes • Congestive cardiac failure, tamponade, valvular disease
Reduced peripheral vascular resistance • Sepsis, hepatorenal syndrome, drug overdose, vasodilators (e.g. antihypertensives)
Local renal hypoperfusion • Renal artery stenosis, malignant hypertension

Factors increasing susceptibility to renal hypoperfusion

Failure to decrease arteriolar resistance • Structural changes in renal arterioles (old age, atherosclerosis, hypertension, CKD) • Reduction in vasodilatory prostaglandins (nonsteroidal anti-inflammatory drugs, cyclooxygenase-2 inhibitors • Afferent glomerular arteriolar vasoconstriction (sepsis, hypercalcaemia, hepatorenal syndrome, ciclosporin / tacrolimus, radiocontrast agents)
Failure to increase efferent arteriolar resistance • Angiotensin converting enzyme inhibitors • Angiotensin receptor blockers
Renal artery stenosis

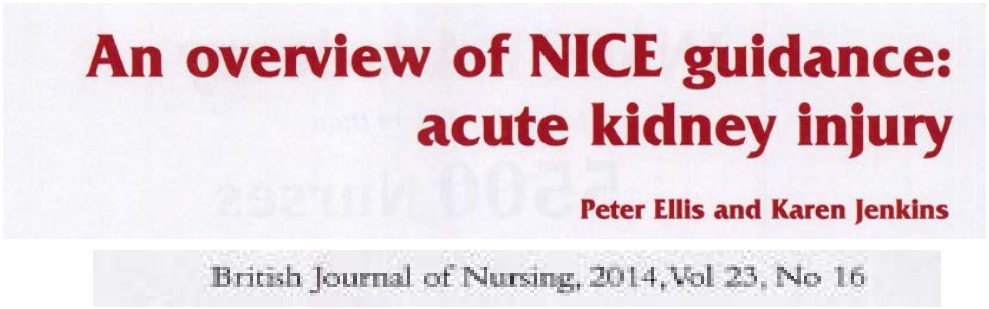
Mesures de prevenció/actuació

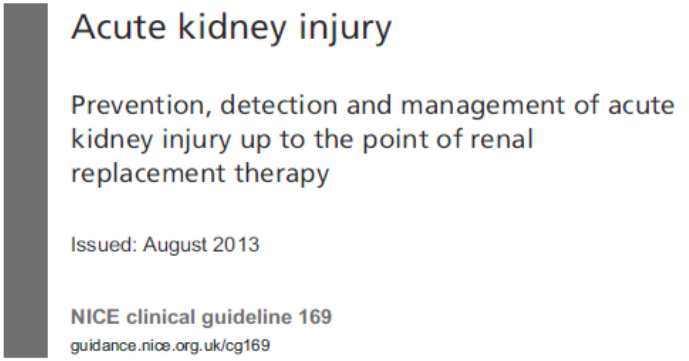
«Estratègies per reduir el fracàs renal agut intrahospitalari»

- Arran de la publicació de la NCEPOD (2009), el "Department of Health" al Regne Unit ha dedicat molts esforços per conscienciar a tots els professionals de la Salut de les conseqüències d'una mala avaluació i maneig del FRA.

- La aplicació de la guia clínica de FRA de la NICE (2013) ha comportat un important suport i una major seguretat en el seu maneig, amb millors resultats.

- La seva aplicació ha requerit un enfoc nacional coordinat amb els diferents professionals de la salut a nivell local (tant en l'ambit de l'atenció primària com especialitzada)





«Estratègies per reduir el fracàs renal agut intrahospitalari»

NHS England » Acute Kidney Injury (AKI) Programme - Windows Internet Explorer

http://www.england.nhs.uk/ourwork/patientsafety/akiprogramme/

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NHS England » Acute Kidney Injury (AKI) Progra...

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High quality care for all,
now and for future generations

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- Improving patient experience
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- Direct commissioning
- Quality improvement and clinical leadership
- Our governing frameworks
- Patient Safety

Home › Our work › Patient Safety › Acute Kidney Injury (AKI) Programme

Acute Kidney Injury (AKI) Programme

Acute Kidney Injury (AKI) is an emerging global healthcare issue. As health care increases in complexity, the interaction between long term medical conditions, medication and inter-current illness are too often complicated by AKI. It is estimated that one in five emergency admissions into hospital are associated with AKI (Wang et al, 2012), that up to 100,000 deaths in secondary care are associated with AKI and that 1/4 to 1/3 have the potential to be prevented (National Confidential Enquiry into Patient Outcome and Death (NCEPOD) Adding Insult to Injury 2009).

The resource and economic burden upon the healthcare economy is considerable. It is estimated that the additional cost is £500 million (data from NHS Kidneycare 2012).

Purpose and vision

search the site

NHS choices — Visit NHS Choices for patient information

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Patient safety alert to improve reporting and learning of medication and medical devices incidents

20 March, 2014

http://www.england.nhs.uk/ourwork/qual-clin-lead/

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London Acute Kidney Inju ×

www.londonaki.net

London Acute Kidney Injury Network

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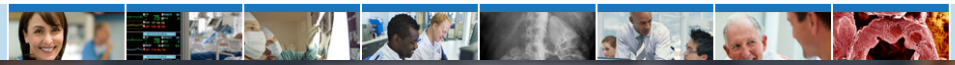

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London Acute Kidney Injury Network

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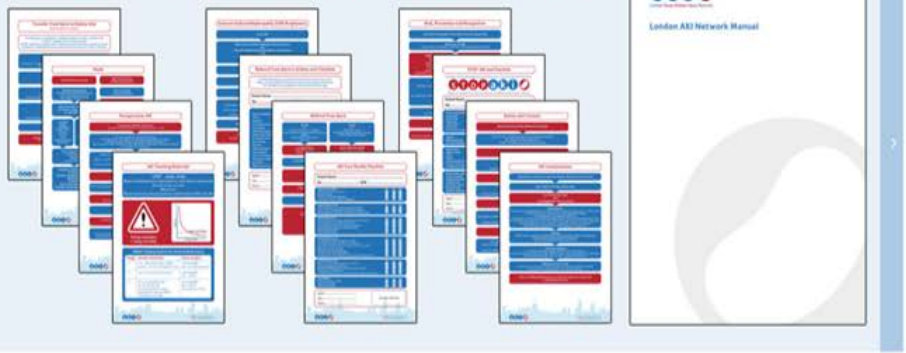


Welcome to the website of the London Acute Kidney Injury Network

Acute kidney injury (AKI), previously known as acute renal failure, is a sudden loss of kidney function. AKI is strongly associated with mortality, increased lengths of stay, chronic morbidity and increased healthcare costs.

The London Acute Kidney Injury Network is a collaboration of healthcare

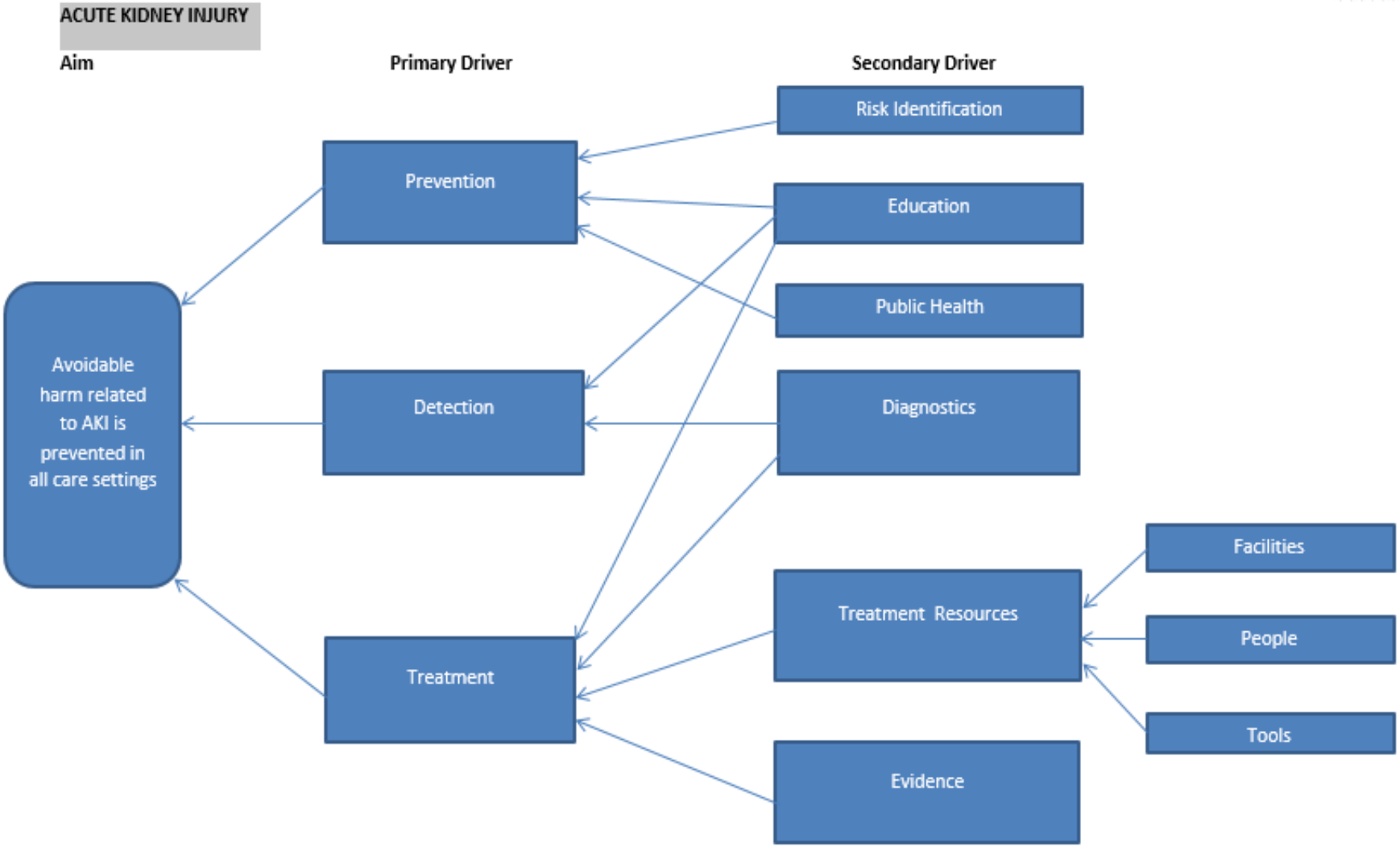
Latest tweet

The BKPA @The_BKPA

We were delighted to celebrate the @RoyalFreeNHS Acute Kidney Unit & hear

www.londonaki.net/research/index.html

«Estratègies per reduir el fracàs renal agut intrahospitalari»



«Estratègies per reduir el fracàs renal agut intrahospitalari»

- La Academy of Royal Medical Colleges ha desenvolupat un marc de competències bàsiques de FRA que descriu la formació necessària per als diferents professionals de la Salut vers la identificacio de pacients en risc de patir un FRA i actuació de forma correcta i precoç.

- S'han facilitat diferents mètodes d'aprenentatge electrònics (BMJ) i creat diferents Apps gratuites (Royal College of Physicians de Edimburg (RCPE) entre altres,..

«Estratègies per reduir el fracàs renal agut intrahospitalari»

Acute Kidney Injury Mobil

https://play.google.com/store/apps/details?id=co.uk.pocketapp.rcpemobile

Google play

Buscar

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Mis aplicaciones

Tienda

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Familiares

Guía para padres

Selección de los editores

Acute Kidney Injury Mobile App

Royal College of Physicians of Edinburgh - 22 de septiembre de 2014 - Sin clasificar

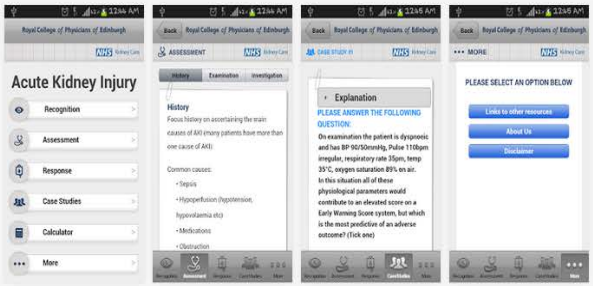
Medicina

Instalar | Añadir a la lista de deseos

Esta aplicación es compatible con todos tus dispositivos.

★★★★☆ (17)

+1 +12 Recomendar esto en Google



¿Quieres traducir la descripción al Español con el Traductor de Google? Traducir

Descripción

Developed by the Royal College of Physicians of Edinburgh and NHS Kidney Care, the Acute Kidney Injury (AKI) Mobile App is a free and practical application available on Android mobile. Features include a medical calculator, interactive exploration of the classification, diagnosis, and management of AKI and its complications, and illustrative case studies.

A key resource for junior doctors and non-renal specialists treating AKI, the app has been endorsed by the Renal Association, the Royal College of Physicians (London), and the Society for Acute Medicine.

ES 15:36 07/06/2015

«Estratègies per reduir el fracàs renal agut intrahospitalari»

Acute Kidney Injury App | Royal College of Physicians of Edinburgh - Google Chrome

https://www.rcpe.ac.uk/policy-standards/acute-kidney-injury-app

Search | Join RCPE | Fellows & Members login

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STANDARDS

Acute Kidney Injury App

Acute kidney injury app

The Acute Kidney Injury (AKI) App, developed by NHS Kidney Care and the Royal College of Physicians of Edinburgh, provides a fast and simple way to explore the latest national guidelines on the diagnosis, prevention and management of AKI.

Offering interactive exploration of the classification, diagnosis, and management of AKI and its complications, illustrative case studies, and a medical calculator, the AKI App is a free and practical application available on the iPad, iPhone, Android tablet, and Android mobile devices.

The clinical lead for this project is Dr Ben Bray, supported by a multi-disciplinary working group, with project management by Bryony Jackson in the Education team.

Key features

- Medical calculator to illustrate the staging and classification of AKI
- Succinct and up-to-date guidelines on the prevention and management of AKI
- Interactive case studies
- Further resources of national and international guidelines on AKI
- Currently available for free on iPad, iPhone and Android tablets

How much does the AKI App cost?

The AKI App is a free application, developed by NHS Kidney Care and the Royal College of Physicians of Edinburgh.

Where can I download the app?

You can find the AKI App on App Store (iPad & iPhone users) and on Google play (Android tablet and Android mobile users):

Download on the App Store | ANDROID APP ON Google play

POLICY & STANDARDS

- Overview
- Policy
- Standards
  - Acute medicine workstream
  - Standards updates and news
  - Consensus conferences
  - Physicians' Census
  - SPARS
  - **AKI app**
- Publications
- News and Blog Posts
- Press Releases

feedback

- Pacients amb MRC (FG < 60 ml/min) i pacients amb funció renal normal, sota tto amb IECAs/ARA-II tenen major risc de FRA en situacions d'hipovolèmia i/o d'hipotensió arterial.

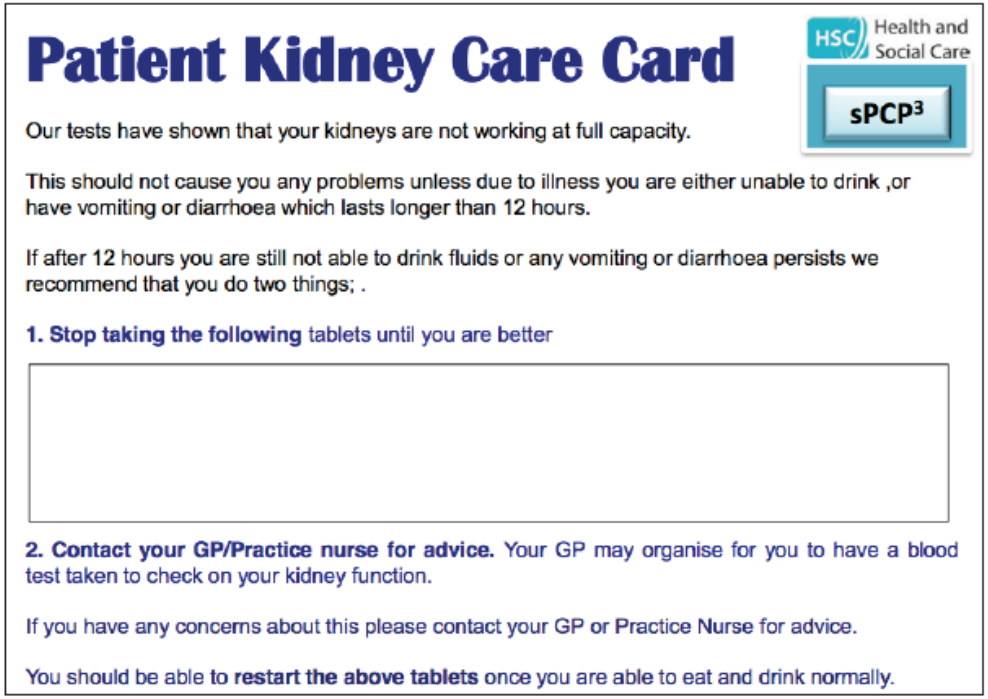
- Els pacients de risc han d'estar ben identificats, ja des de **l'assistència primària** i "familiaritzar-los" en l'autocura.

Ulster Med J 2014;**83(3):**149-157

«Estratègies per reduir el fracàs renal agut intrahospitalari»

- La creació d'una "Community Kidney Card" proporcionaria a aquells pacients prèviament identificats com a pacients de risc en actuar d'una forma determinada, donant d'intruccions per aturar temporalment determinats fàrmacs que puguesin induir, exacerbar o complicar un FRA.

- **"DAMN":**
  - **D**iurètics
  - **A**CEI/ **A**RBs
  - **M**etformin
  - **N**SAIDs



Patient Kidney Care Card

HSC Health and Social Care

sPCP3

Our tests have shown that your kidneys are not working at full capacity.

This should not cause you any problems unless due to illness you are either unable to drink ,or have vomiting or diarrhoea which lasts longer than 12 hours.

If after 12 hours you are still not able to drink fluids or any vomiting or diarrhoea persists we recommend that you do two things; .

1. Stop taking the following tablets until you are better

2. Contact your GP/Practice nurse for advice. Your GP may organise for you to have a blood test taken to check on your kidney function.

If you have any concerns about this please contact your GP or Practice Nurse for advice.

You should be able to **restart the above tablets** once you are able to eat and drink normally.

Fig 4. Community Kidney Care Card

Ulster Med J 2014;**83(3):**149-157

En pacients hospitalitzats, el FRA hauria de seguir els següents principis:

- Avaluació de riscos (risk assessment)

Acute Kidney Injury (AKI) Risk Assessment Tool for Acute MEDICAL patients aged 60 years and over

Risk factor	Score (circle each that applies)
*Co-morbidities (≥ 2)	2
Baseline GFR <60 mls/min	2
Systolic BP < 100mmHg	2
Receiving IV fluids	2
**Nephrotoxic medications	1
Total score:	

*Co-morbidities = IHD, Heart Failure, Hypertension, Diabetes, COPD, TIA/CVA, PVD

**Nephrotoxic medications = ACEi/ARB, NSAIDs, Diuretics

If risk score is ≥ 3 then patient is AT RISK OF AKI

Follow guidance on Pre-emptive Management

Fig 5. Example of an admission AKI risk assessment tool

Patients at risk of AKI

Age over 65 years
Existing CKD (eGFR < 60 mL/min/1.73m²), Previous episode(s) of AKI
Co – Morbidity (Cardiac / Liver failure, Diabetes Mellitus
Use of nephrotoxic drugs (Diuretics, ACEi/ARBs, NSAIDs)
Diagnosis of sepsis
Hypovolaemia / Hypotension / Oliguria (< 0.5 mL/kg/hr)
Deteriorating Early Warning Scores
Symptoms / history or condition that may lead to urinary tract obstruction
Use of iodinated contrast agents within the previous week

NICE National Institute for Health and Care Excellence

Ulster Med J 2014;**83(3):**149-157

En pacients hospitalitzats, el FRA hauria de seguir els següents principis:

- Avaluació de riscos (risk assessment)

El FRA perioperatori és freqüent. Un reconeixement d'aquells pacients de risc, permetrà prendre mesures per reduir l'exposició a insults i maximitza la recuperació del FRA

- Optimització del balanç hídric: fluid-deplection / fluid overload
- Optimització de la PA (correcció si PA < 110 mm Hg)
- Revisió de la medicació
- Minimitzar/reduir el risc de Nefropatia per contrast

Fig 6. Example of a Surgical AKI risk assessment tool

HSC Southern Health and Social Care Trust

Patient name_____
Hosp No_____
DOB_____
Or attach Patient Label

Date of admission: _____

Acute Kidney Injury (AKI) Risk Assessment Tool for SURGICAL Patients aged 60 years and over
***To be completed for both elective or emergency patients**

Risk Factor	Score (circle each that applies)
Elective intra-abdominal or major vascular surgery	2
Emergency intra-abdominal or major vascular surgery	3
* Co-morbidities (≥ 2)	2
Baseline GFR < 60 mls/min	2
Systolic BP < 100mmHg	2
-- Nephrotoxic medications (Pre-admission)	1

Total score on admission: ☐

If a decision to operate is made after the initial AKI Risk Assessment the patient MUST be re-assessed taking into account the proposed surgery

Total score following decision to operate: ☐

* Co-morbidities = IHD, Heart Failure, Hypertension, Diabetes, TIA/CVA, PVD
-- Nephrotoxic medications = ACEI/ARB, NSAIDs, Diuretics

If risk score is ≥ 3 then patient is AT RISK OF AKI

Follow guidance on Pre-emptive Management

***'AKI – AT RISK'* - Pre-emptive Management**

1. Daily U+E: Follow AKI protocol if creatinine increase >30 μmol/l from baseline value
2. Close recording of urine output: Follow AKI protocol if UO<400mls/12hrs
3. If BP< 130/80 hold antihypertensive drugs (unless clear medical indication)
4. Use NSAIDs / Aminoglycosides with caution if GFR < 30ml/min
5. Avoid NSAIDs / Aminoglycosides if GFR < 20ml/min

Unless dialysis dependent

6. Hold ACE i / ARB and restart 48hrs post op (provided creatinine within 30 μmol/l of baseline)
7. If hypovolaemic or hypotensive resuscitate as per AKI protocol (ICU review if non responsive to fluids at 2hrs or if hypotension recurs following an initial response)

Ulster Med J 2014;**83(3):**149-157

«Estratègies per reduir el fracàs renal agut intrahospitalari»

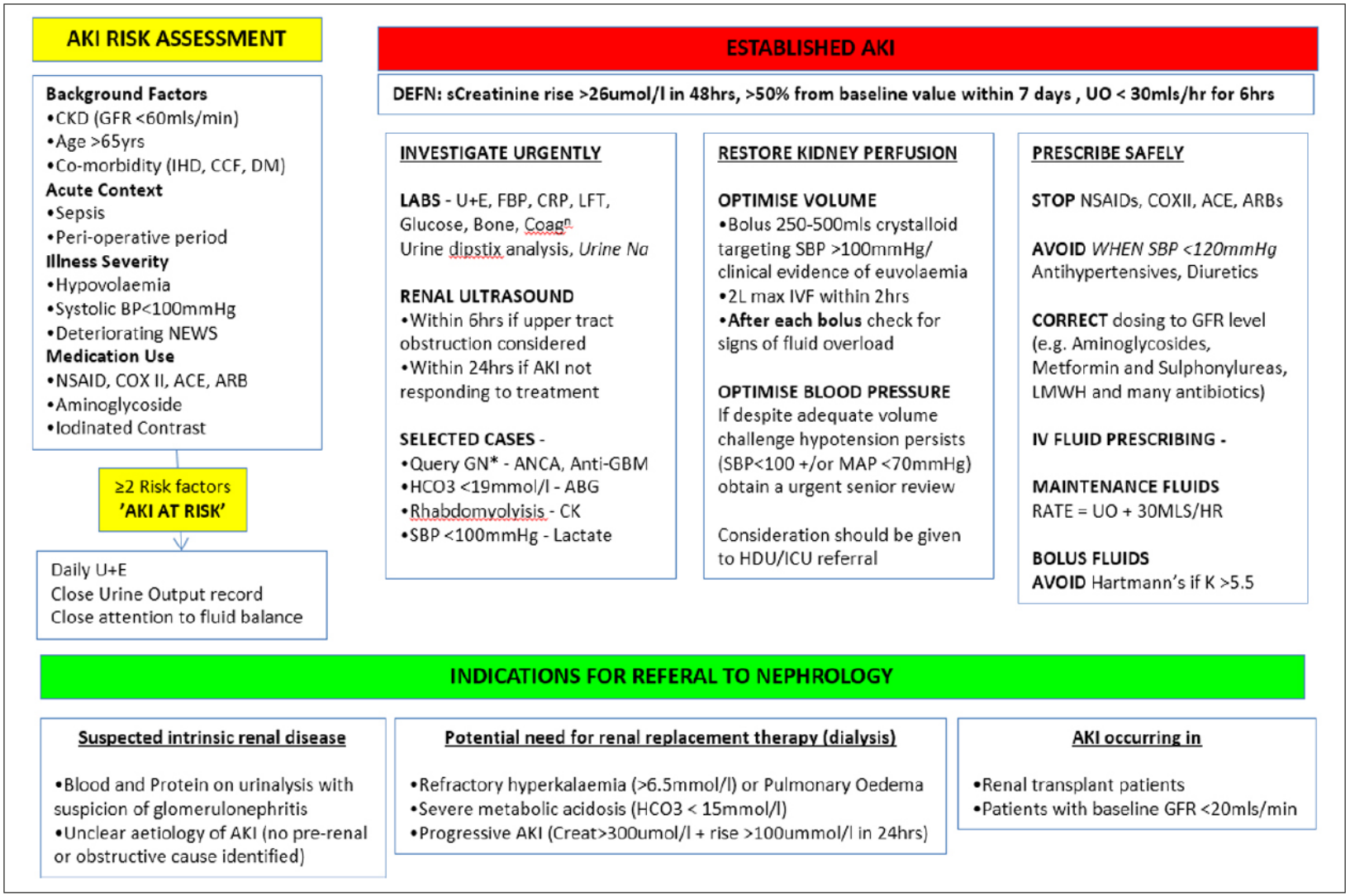


Fig 3. Northern Ireland GAIN AKI Algorithm

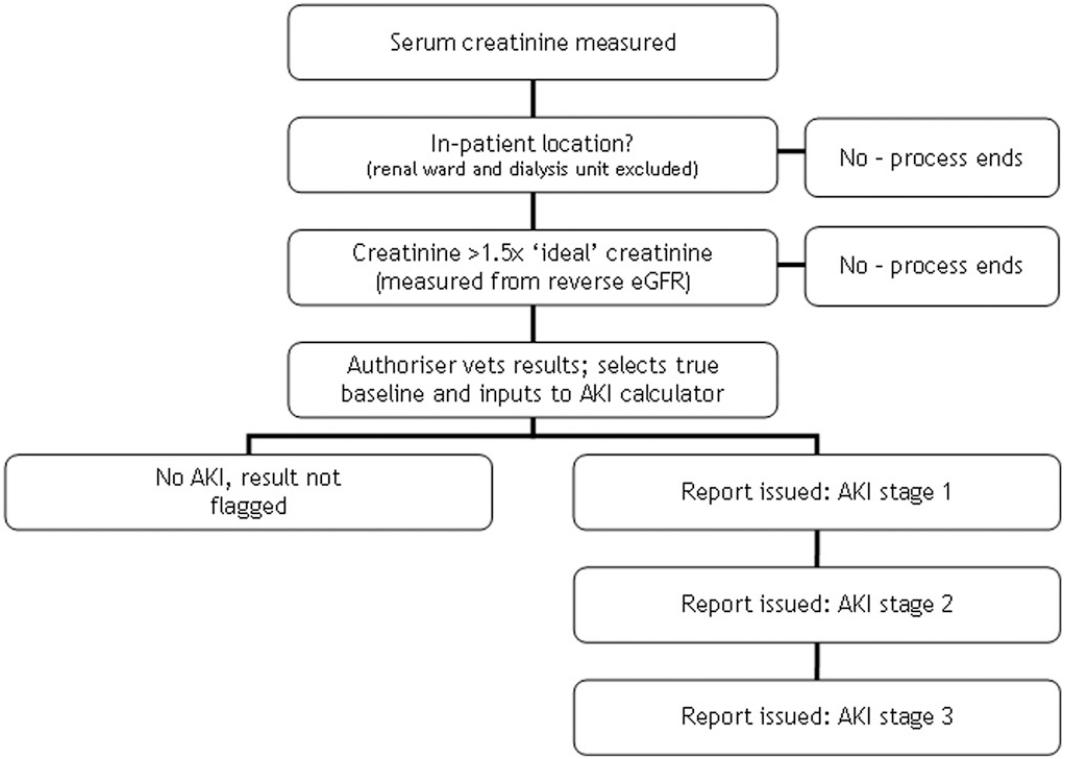
Ulster Med J 2014;**83(3):**149-157

- Tot i l'elevada freqüència dels episodis de FRA hospitalari, només un 10 % requereixen una avaluació i tractament directa per part del nefròleg.

- Aproximadament només un 4 % dels episodis de FRA requereixen TSR.

- La gran majoria dels episodis de FRA hospitalaris formen part de processos intercurrents per altres motius, estan a càrrec d'altres clínics (no nefròlegs) **que poden NO estar avesats a reconeixer el significat pronòstic i terapèutic d'una detecció i correcció precoç del FRA.**

- La creació d'algoritmes facilita una detecció i un maneig correcte.



Permet l'elaboració de SISTEMES D'ALERTA o E-alerts

RCPE

ACUTE KIDNEY INJURY
UK CONSENSUS CONFERENCE

Management *of* acute kidney injury: *the* role *of* fluids, e-alerts *and* biomarkers

Friday 16–Saturday 17 *November* 2012

Supplement 19 to the Journal *of* the Royal College *of* Physicians *of* Edinburgh

RCPE UK Consensus Conference Management of acute kidney injury: the role of fluids, e-alerts and biomarkers

Authors/members of Consensus Panel: Feehally J (Co-Chair); Gilmore I (Co-Chair); Barasi S; Bosomworth M; Christie B; Davies A; Dhesi J; Dowdle R; Gibbins C; Gonzalez I; Harding S; Lamont D; Murphy G; Ostermann M; Parr J; Stevens PE.

INTRODUCTION

Acute kidney injury (AKI) is a common, life-threatening condition associated with poor outcomes. Current NHS expenditure on AKI and its consequences is greater than for prostate, bowel and lung cancer combined. There is evidence that many patients are not well managed and 20–30% of cases are potentially avoidable. Optimal care could save up to 12,000 lives a year and produce substantial financial savings. Clear clinical guidelines on the early identification and management of patients with AKI will help to inform the effective commissioning of care for these patients.

AKI may present in primary care or as acute admissions to hospital, but may also develop during hospital admission. Only a minority of AKI cases will reach specialist nephrology care. Many people with AKI are frail and elderly with complex co-morbidity, and present with acute illness.

Care of patients can be improved by doing the basics well. This includes:

- Early recognition of those at risk of AKI
- Informing patients at risk of AKI and their carers when to temporarily discontinue ACE inhibitors (ACEi) angiotensin receptor blockers (ARB), diuretics and non-steroidal anti-inflammatory drugs (NSAID) during acute illness.
- Improved training and education of clinical teams responsible for their care
- Hospitals must provide adequate systems and staffing to deliver high quality care, ensuring continuity of care and appropriate escalation to senior medical staff for assessment of complex cases
- Agreed referral criteria for specialist nephrology input
- Assessment of risk factors for AKI in all acutely ill patients. Risk scores, already in use in some patient groups at risk of AKI, need to be developed and validated for wider use.
- All patients admitted non-electively into hospital and all acutely ill patients in primary care will require assessment of their volume status, urinalysis and a medicines review. ACEi/ARB, NSAID should be withheld pending senior review within 12 hours.
- All patients admitted non-electively into hospital should also have baseline measurement of serum creatinine and electrolytes (including chloride), repeated within 24 hours. Urinalysis will help to identify the minority with intrinsic kidney disease that require early specialist assessment.

An international clinical practice guideline on AKI has recently been published (*Kidney Disease Improving Global Outcomes – KDIGO*). In the UK, NICE guidance on AKI is in preparation. This consensus statement makes recommendations on three aspects of AKI care which are not a major focus of the KDIGO and NICE work.

What is the role of fluid therapy in AKI?

Summary: Fluid therapy should be guided by repeated evaluation of volume status. A balanced salt solution should be the usual fluid for volume replacement.

- All hospitals must have fluid therapy guidelines for resuscitation, replacement and maintenance which will inform the timeliness of intervention, choice of fluid, and frequency of reassessment
- Patients with AKI receiving intravenous (IV) fluid therapy require regular re-evaluation of volume status, daily weights, and regular monitoring of creatinine and electrolytes (including chloride and bicarbonate).
- Evaluation of volume status should be based on history, cumulative fluid balance and clinical examination (including pulse, blood pressure (BP), jugular venous pressure, capillary refilling, weight and postural change in pulse and BP).
- Clinical assessment of volume status is difficult and should be a focus for education and training of clinical staff.
- Central venous pressure (CVP) measurement does not have a role in the routine assessment of volume status in the ill patient at risk of AKI.
- Choice and prescription of maintenance IV fluids must be guided by a daily assessment of the patient's water and electrolyte requirements.

What is the role of e-alerts in acute kidney injury?

[1]NM Selby, [2]MAJ Devonald

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ABSTRACT Acute kidney injury (AKI) is common, harmful and often preventable, yet standards of clinical practice are variable. A significant contributor to reported deficiencies in care is the delay or even failure to diagnose AKI. There is therefore considerable interest in developing electronic systems to report the presence of AKI and alert the clinician to its occurrence with the aim of triggering earlier, more effective intervention. However, there are considerable technical complexities in developing such systems when the current diagnostic criteria for AKI are employed. This paper will review the studies published in this area that have attempted to tackle this problem, as well as discussing the challenges and potential solutions.

KEYWORDS Acute kidney injury, AKI, e-alert, electronic alert, electronic reporting

DECLARATION OF INTERESTS No conflicts of interest declared.

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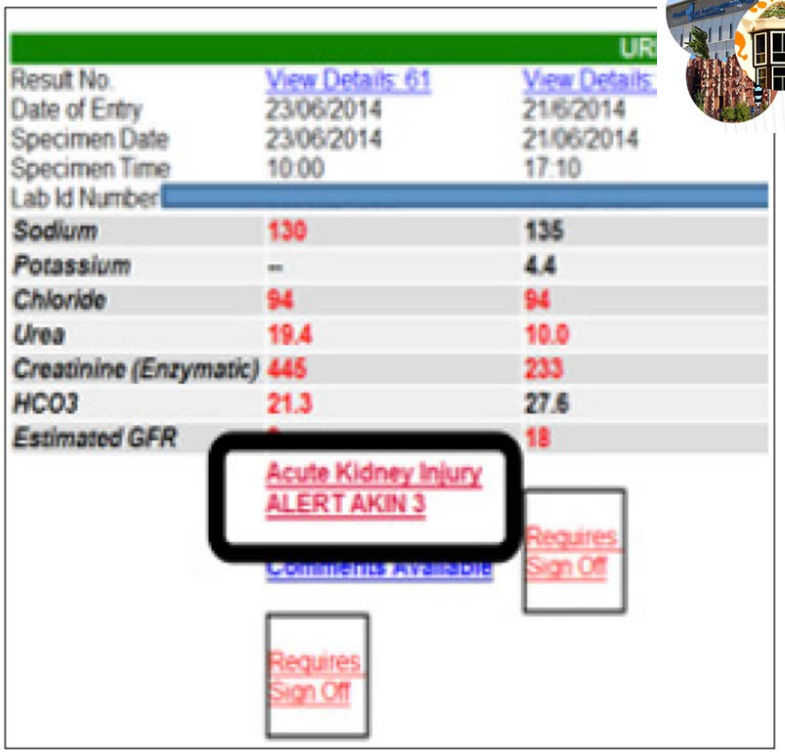
INTRODUCTION

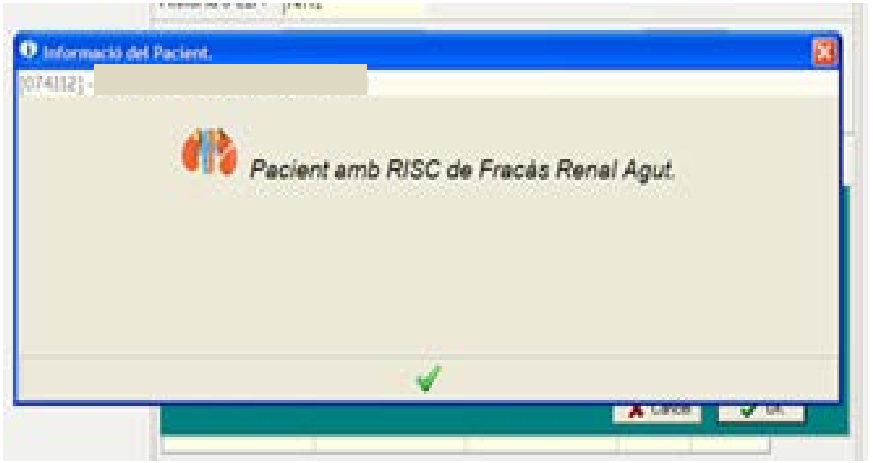
Acute kidney injury (AKI) is common, occurring in up to 22% of hospital admissions and is associated with poor outcomes.[1] These include prolonged admissions, elevated mortality rates, accelerated progression of chronic kidney disease (CKD) and significantly increased healthcare costs.[2,3] These poor outcomes are due in part to variable standards of care, highlighted in a National Confidential Enquiry into Patient Outcome and Death (NCEPOD)[4] and other reports.[5–7] A significant contributor to these poor standards was the delay in diagnosis or failure to recognise AKI, sometimes attributable to the fact that many patients with AKI are cared for by non-nephrologists.[4] Despite an absence of specific treatments for AKI, early intervention focusing on the basic elements of care (fluid balance, haemodynamic observations, medication review, appropriate investigation) can improve outcomes.[8]

There is therefore an urgent need to improve early recognition and treatment of AKI and the development of electronic alert systems (e-alerts) would seem to be an effective way of doing this. The aims of such systems are to automatically and systematically identify all AKI episodes, notify the responsible clinician and therefore trigger earlier intervention. E-alerts can be influential on patient outcomes,[9] but to date there have been few attempts at introducing such systems for AKI. This may be due in part to the relatively short period of time since the widespread acceptance of the risk, injury, failure, loss, end-stage renal disease (RIFLE) and subsequent acute kidney injury network (AKIN) criteria. Furthermore, these criteria are based on a relative change in serum creatinine with respect to an individual's baseline creatinine level, which presents a significant challenge to the use of current pathology software for their prospective application in clinical practice. This issue of prospective application is highlighted in the recent *Kidney Disease: Improving Global Outcomes (KDIGO)* guidelines that, for the first time, specifically discuss recommendations for using these criteria in 'real life' clinical practice.[10] The development of e-alert systems for AKI therefore remains in its early stages. This paper will summarise current knowledge as well as discussing the technical challenges and potential solutions in this area.

PUBLISHED STUDIES ON E-ALERTS IN AKI

Currently available studies were identified by a systematic search of the following databases: Medline/Pubmed, Embase, Cochrane Library, NHS Evidence, Health Business Elite, Health Management Information Consortium, UptoDate and are summarised in Table 1. The first study to describe a successful alert focused on the management of medicines in AKI and predated current diagnostic criteria.[11] Rind et al. developed an email alert for patients prescribed nephrotoxic or renally excreted medicines and who developed AKI (defined as an acute rise in serum creatinine level of >44 μmol/L for nephrotoxic medications and >50% rise for renally excreted drugs). The authors studied 922 patients using a time series study design and found a significant reduction in the time it took to adjust the medication during the intervention period (97.5 hours vs 75.9 hours). Despite this improvement, the length of time to medication adjustment remained more than three days even after the intervention was introduced. The main beneficial effect of alerts was seen with patients on renally excreted drugs that





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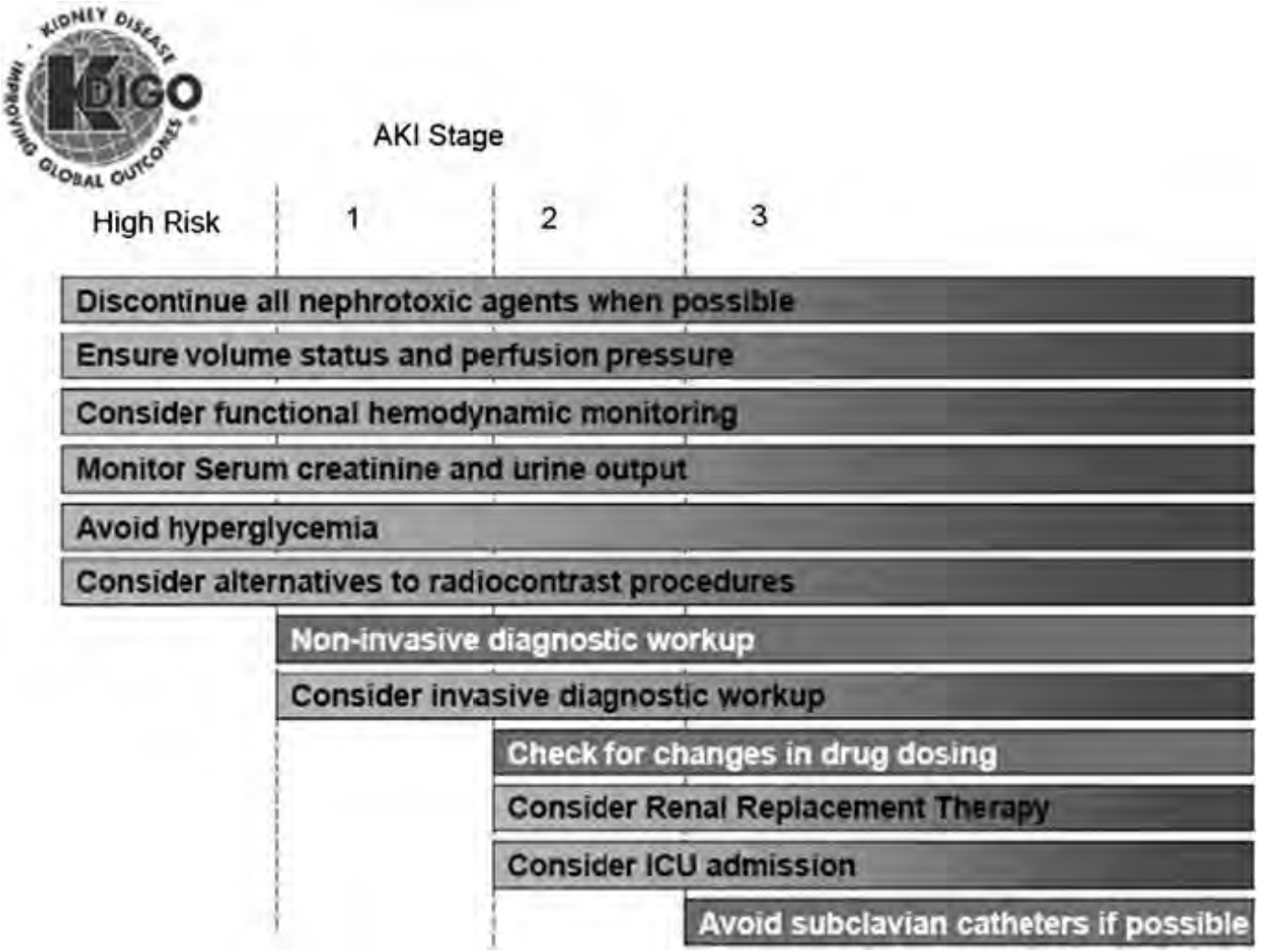

KDIGO Clinical Practice Guideline for Acute Kidney Injury.
Kidney International Supplements (2012) 2, 1–138

«Estratègies per reduir el fracàs renal agut intrahospitalari»

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Clinical Practice Guidelines Committee Modules Other Guideline Organisations Old Guidelines Guidelines to Review Joint Guidelines Commentary on KDIGO Guidelines

Clinical Practice Guidelines Committee

Introduction

Chair: Dr Andy Lewington, andrew.lewington@nhs.net.

The Clinical Practice Guidelines Committee was established by the UK Renal Association (RA) to prepare guidelines for the management of patients with renal disease and help identify the data to be collected by the Renal Registry.

The RA has produced guidance on best practice in the management of patients with kidney disease since 1995. The RA Clinical Practice Guidelines are not funded by any external organisation, commercial company or charity.

In 2013 it was agreed that for appropriate topics The Renal Association would produce joint adult and paediatric guidelines with the British Association for Paediatric Nephrology .

NICE Accreditation

The National Institute for Health and Care Excellence (NICE) has accredited the process used by The Renal Association to produce its Clinical Practice Guidelines. Accreditation is valid for 5 years from 9 November 2010.

Accreditation helps health and social care professionals identify the most robustly produced guidance available, enabling them to deliver high quality care.

More information on accreditation can be viewed at http://www.nice.org.uk/accreditation

NICE accredited
www.nice.org.uk/accreditation

Clinical Practice Guidelines Commitee 2013

Andy Lewington (Chair)	Shona Methven
Neil Duncan	Clara Day
Vicky Briggs	Graham Woodrow
Andrew Mooney	Ed Sharples
Simon Steddon	Marlies Ostermann

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Joint Guidelines
Guideline Policy Manual
Old Guidelines
Other Guideline Organisations

Guidelines Search

daily patient care. An essential part of the guideline development process is the formulation of a dissemination and

Award winning website, run by the Nephrology Section of East Carolina University, provides quality teaching material, free of charge to the development of nephrology training.
Resource Type :

Conclusions

Conclusions

- El FRA intrahospitalaria té una incidència no rebutjable i 2/3 dels casos la situació de “Risk” sovint s’inicia abans de l’admissió a l’hospital.

- A tot pacient s’hauria d’avaluar el risc de FRA de forma regular tant en el moment de l’ingrés com al llarg de la seva estada hospitalària.

- En el procès de FRA hi participen diferents professionals sanitaris. Es precís realitzar campanyes de informació i entrenament per reconéixer situacions de risc per FRA i establir mesures de correcció ràpides i apropiades per una eficàcia, eficiència i efectivitat.

- La sistematització en l’ús d’algoritmes i la utilització de recursos tècnics i informàtics mitjançant la creació d’alertes electròniques (e-alerts) es fa altament recomanable.

«Estratègies per reduir el fracàs renal agut intrahospitalari»