

Adding Insult to Injury – NCEPOD Report 2009

A review of the care of patients who died in hospital with a primary diagnosis of acute kidney injury (acute renal failure)

Patients with acute kidney injury (AKI) die. AKI often develops insidiously with only subtle signs that anything is wrong. Low blood pressure, acute illness, dehydration and many drugs precipitate AKI. Prioritisation of those at risk for AKI and early recognition of AKI is important to prevent the often fatal consequences.

AKI lacks a standard definition. All patients are at risk but it is unknown whether potential deficiencies of care or lack of expert advice and intensive support are to blame.

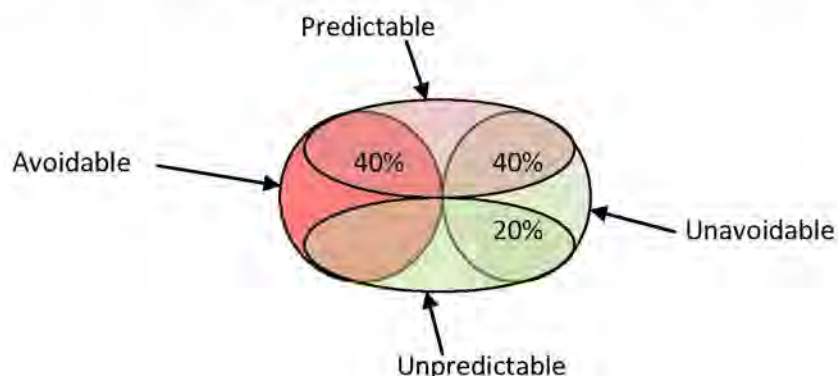
The study examined all patients in UK hospitals over the age of 16 between January 1st and March 31st 2007. All patients coded with a primary or secondary diagnosis of AKI who died within the study period were included. Clinical questionnaires and casenote review was undertaken. 1518 cases were identified, 1045 were included after clinician review, full data was available on 564. It was noted there was a definite lack of post-surgical patients which suggested that the coding was incorrect for this group.

Admission and Assessment

The vast majority was elderly (~80% > 75 years old) and from General Medicine and Care of the Elderly specialties (~60%). 88% had evidence of kidney disease on admission, in 46% this was a new diagnosis. In only 14% was the AKI thought to be unavoidable but 50% had some deficiencies in clinical care which contributed (66% when AKI occurred post-admission, only 30% when already present pre-admission).

The higher the grade of doctor performing the initial assessment the less likely the degree of illness was under-recognised. 45% of AKI patients did not have MEWS scores documented. Unacceptable delay in treatment was a factor in 43% of post-admission AKI. Risk factor assessment/documentation was poor, with only 3% having all the “top ten” risk factors recognised: 29% had inadequate assessment – 24% of those admitted and 54% of those developing AKI post-admission.

Of 55 (of 107) cases in whom the predictability and avoidability of the cause of AKI could be determined, 40% were predictable and avoidable and only 20% were neither.



The complications of AKI were not recognised in 13% and avoidable in 17%. In 22% these were managed inappropriately. Referral to nephrology occurred in 31% (but late in 22%), but in a further 19% this would have been appropriate but was not done

Key findings:

- Only 50% of AKI management was good
- Risk factor assessment was poor
- Recognition of AKI was delayed
- 20% of post-admission AKI was both predictable and avoidable
- Complications of AKI were missed in 13%, avoidable in 17% and managed badly in 22%

Recommendations

- Initial clerking of all emergency patients should include a risk assessment for AKI. (Clinical Directors and Medical Directors)
- All patients admitted as an emergency, regardless of specialty, should have their electrolytes checked routinely on admission and appropriately thereafter. This will prevent the insidious and unrecognised onset of AKI. (Clinical Directors and Medical Directors)
- Predictable and avoidable AKI should never occur. For those in-patients who develop AKI there should be both a robust assessment of contributory risk factors and an awareness of the possible complications that may arise. (Clinical Directors and Medical Directors)
- Undergraduate medical training should include the recognition of the sick patient and the prevention, diagnosis and management of AKI. (Deaneries)
- Postgraduate training for all specialties should include awareness, causes, recognition, management and complications of AKI. (Deaneries)

Investigation and Management

AKI most frequently caused by ischaemic, septic or toxic insult. 33% were inadequately investigated lacking an average of 3 investigations per patient (ultrasound scan, acid base balance, volume status, urinalysis, MEWS, sepsis recognition, biochemistry, other, TPR, immunology, CT, radioisotope scanning, renal biopsy).

Appropriate management was frequently lacking: 12% did not have a fluid balance chart and 22% did not have hourly urine measurements, 19% had no regular biochemistry tests, in 25% hypovolaemia was not corrected and 8% did not have discontinuation of nephrotoxic drugs. 9% had inappropriate drugs used – diuretics in the volume deplete, “low-dose” dopamine, ACE inhibitors, NSAIDs and contract media in AKI.

Recommendations

- Reagent strip urinalysis should be performed on all emergency admissions. (Clinical Directors and Medical Directors)
- NCEPOD recommends that the guidance for recognising the acutely ill patient (NICE CG 50) is disseminated and implemented. In particular all acute patients should have admission

physiological observations performed and a written physiological monitoring plan made, taking into account the degree of illness and risk of deterioration. (Clinical Directors and Medical Directors)

- Trusts need to put in place a mechanism to ensure that NICE guidance (CG 50) has been implemented. An audit of patients who suffer serious adverse events (cardiac arrest or unplanned admission to critical care) to assess compliance with NICE CG 50 should be presented to the Trust Clinical Governance Committee on an annual basis. (Clinical Directors and Medical Directors)

Referral and Support

32% were referred to nephrology. 66% were seen within 1 day, but more than 7 days was the delay in around 5%. 21% had telephone advice only, 47% ward review, 16% transfer to ITU and 17% transfer to renal unit. A study in 1997 showed only 22% of AKI patients were referred to nephrology – this study shows this is still similar. Of those who were not referred, 77 (20%) should have been (12% for a clinical opinion, 6% for management without RRT [Renal Replacement Therapy = dialysis or equivalent]).

“Nephrologists would not wish to be referred every inpatient who developed mild renal impairment or be asked to opine on the utility of renal replacement therapy in patients who were clearly dying”. But there needs to be some clarity about the role and expectations of nephrology services in our current acute hospital structure.

In 21% referral was not timely, in 16% nephrology advice was deemed inappropriate and in 12% the frequency of nephrological review was inadequate.

When patients were referred in a timely manner to nephrology the proportion who received good care increased to 69%.

Recommendations

- When referral is made for specialist advice from nephrologists prompt senior advice and a review where appropriate is required. All patients with AKI should be promptly discussed by the renal registrar with their consultants. (Clinical Directors and Medical Directors)
- Every hospital should have a written guideline detailing how the three clinical areas where patients with AKI are treated (critical care unit, the renal unit and the nonspecialist ward) interact to ensure delivery of high quality, clinically appropriate care for patients with AKI. (Clinical Directors and Medical Directors)

Renal Replacement Therapy

12% received RRT. The type of RRT was appropriate in 64/67 patients. "It may appear remarkable that such a low percentage of patients who died due to AKI received RRT. However, it must be remembered that often AKI is a reflection of multi-system disease and that RRT may not alter the eventual outcome."

The proportion who received RRT was significantly younger (median age 64) than those who did not (median 75 years). "Age itself should not be used to limit access to therapy or treatment" although this may reflect underlying disease and reversibility. However, studies have shown that more patients would be received for RRT by nephrologists than would be referred by general and elderly care physicians.

60% of AKI patients on ITUs had nephrological input.

In 36 cases RRT should have been given but was not. In 8 of these this was due to lack of ITU/renal unit beds.

Decisions to limit treatment were not discussed with the patient as often as expected, although the remainder appeared to have been discussed with a relative. In the 301 cases the decision was appropriate in 284.

Recommendations

- Early recognition of at risk patients should allow patient involvement in treatment limitation decisions before clinical condition deteriorates and the opportunity for this involvement is missed. (Clinical Directors and Medical Directors)
- Treatment limitation decisions should be made with reference to guidance produced by the GMC and within the legislative framework of the Mental Capacity Act. (Clinical Directors and Medical Directors)

Recognition of Severity of Illness

Inadequate senior review (in 24%) led to poor care (91% suboptimal vs. 37%). Outreach was not involved in 85%, inappropriately not in 24% of these (20% of total). 16% would have benefitted from transfer to a higher-care area but were not. The overall quality was better in those transferred (40% suboptimal vs. 54%).

Recommendations

- All acute admissions should receive adequate senior reviews (with a consultant review within 12 hours of admission as previously recommended by NCEPOD3. (Clinical Directors and Medical Directors)
- There should be sufficient critical care and renal beds to allow rapid step up in care if appropriate. (Department of Health)

Organisation of Renal Services

72% of hospitals accepted emergency admissions. Of those, 46% had onsite nephrologists. 92% of these were specialist nephrologists, 8% physicians with an interest. Of those without onsite nephrologists, 38% of the nephrologists were in the same trust on a different site, 23% were in the same city in a different trust and 39% were further afield. 94% of all had access to nephrology advice on call.

87% of acute admitting hospitals could deliver RRT in level 2 or level 3 beds. In 58% this is prescribed by intensivists alone, 32% jointly with nephrologists and in 9% by nephrologists alone.

12% of acute admitting hospitals did not have access to ultrasound out of hours on weekdays and 13% at weekends. 30% had no out of hours nephrostomy provision (32% at weekends).

Recommendations

- All acute admitting hospitals should have access to either onsite nephrologists or a dedicated nephrology service within reasonable distance of the admitting hospital. (Clinical Directors and Medical Directors)
- All acute admitting hospitals should have access to a renal ultrasound scanning service 24 hours a day including the weekends and the ability to provide emergency relief of renal obstruction. (Clinical Directors and Medical Directors)
- All level 3 units should have the ability to deliver renal replacement therapy; and where appropriate these patients should receive clinical input from a nephrologist. (Clinical Directors and Medical Directors)

Locally:

Portsmouth has an onsite transplanting renal unit with on-call non-resident specialist registrars (SpR) and consultants. All referrals to nephrology receive immediate telephone advice by an SpR and consultant opinion within 24 hours, earlier if admission to the renal unit is required/expected or if treatment is deemed futile. All new admissions to the Portsmouth renal unit are seen within 24 hours by a consultant nephrologist.

PHT Critical Care Unit appointed a triple-accredited intensivist, general physician and nephrologist in 2007, who delivers renal opinion and management on the ITU. Joint renal meetings are held regularly.

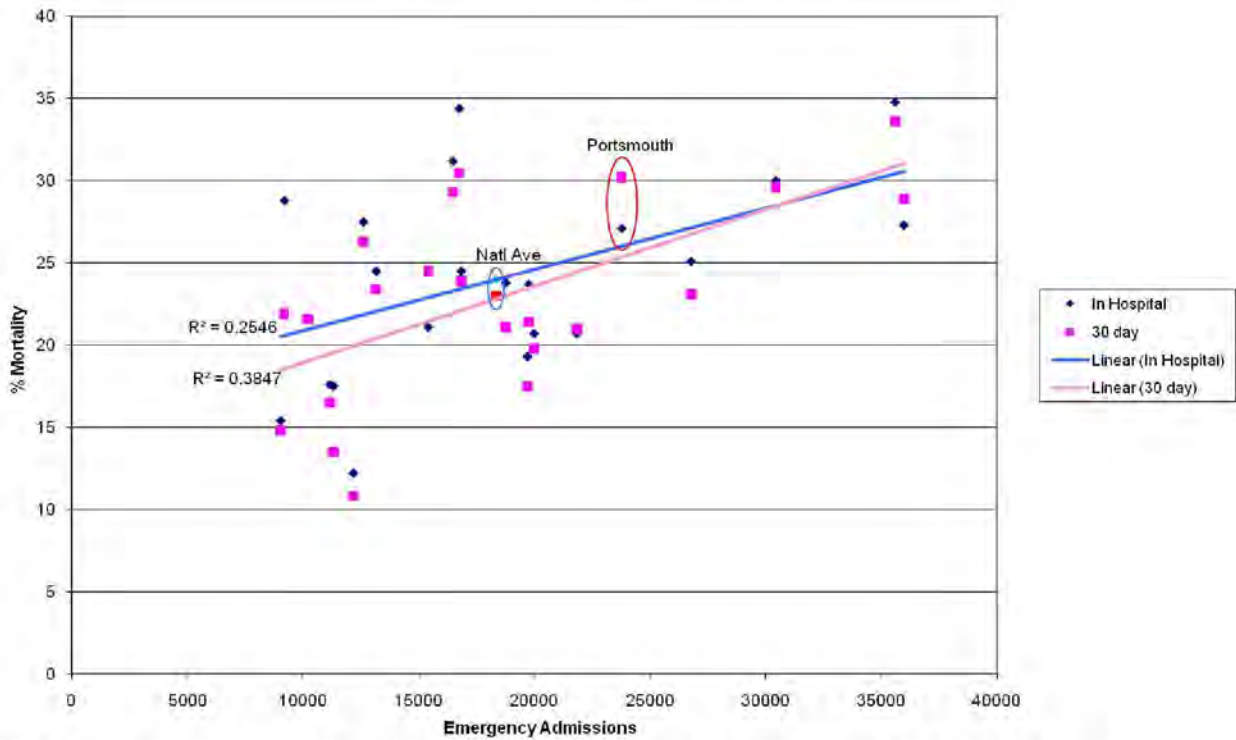
The data for the NCEPOD report was released earlier this year. In deaths from AKI, Portsmouth ranks 15/22 for in hospital deaths from AKI (27.1%, national average 24%, range 12.2 to 34.8%) in transplanting units: table below.

Transplant Units	# em	% renal	#	% und ren	% <75	% HD	LoS	% I/H mort	% 30d mort
Barts & The London	12173	1.2	148	45.3	75.7	4.1	7	12.2	10.8
Royal Free	9029	1.8	162	28.4	45.1	7.4	7	15.4	14.8
Hammersmith	11312	2.4	275	49.1	62.5	0.7	9	17.5	13.5
Central Manchester & Childrens	11154	0.8	91	45.1	65.9	14.3	15	17.6	16.5
Royal Liverpool	19697	1.4	274	19	52.2	5.8	9	19.3	17.5
Uni Birmingham	19982	1.7	333	44.7	63.7	14.7	7	20.7	19.8
Oxford Radcliffe	21832	1.4	309	34.6	45	4.9	8	20.7	21
Plymouth	15404	1.9	298	47	35.6	2	9	21.1	24.5
Guy's & St Thomas'	10203	2.1	213	28.6	53.5	4.7	10	21.6	21.6
Newcastle	19756	1.5	304	22.4	46.4	7.6	10	23.7	21.4
North Bristol	18768	2	383	38.4	46.5	15.4	10	23.8	21.1
Cambridge Uni	13163	2.1	274	25.5	41.2	5.1	9	24.5	23.4
St George's	16836	1.4	188	17.6	40.4	8.5	7	24.5	23.9
Sheffield	26780	1	255	21.6	43.9	7.8	9	25.1	23.1
Portsmouth	23777	1.6	384	16.9	38.5	3.6	7	27.1	30.2
Nottingham Uni	35979	1.9	682	12.2	41.9	4.7	6.5	27.3	28.9
King's College	12603	1.3	167	16.8	46.7	9.6	11	27.5	26.3
St Mary's	9193	0.8	73	0	47.9	1.4	9	28.8	21.9
Leeds	30454	1.5	453	53.2	38.6	6.6	11	30	29.6
Epsom & St Helier	16474	1.7	276	41.7	42	7.2	9	31.2	29.3
Coventry & Warwickshire	16754	1.7	279	39.4	35.5	0.4	9	34.4	30.5
Leicester	35604	1.6	577	0.2	38.8	2.4	9	34.8	33.6
National Average	18360	1.6	275	27	45	5	9	24	23

em = number of emergency hospital admissions during the 12 month study period, % renal = % of admissions with AKI, % und ren = % of AKI under renal teams, % <75 = % of AKI patients under 75 years old, % HD = % of AKI patients who received RRT, LoS = length of stay for AKI patients, % I/H mort = in-hospital mortality for AKI patients, % 30d mort = 30 day mortality for AKI patients

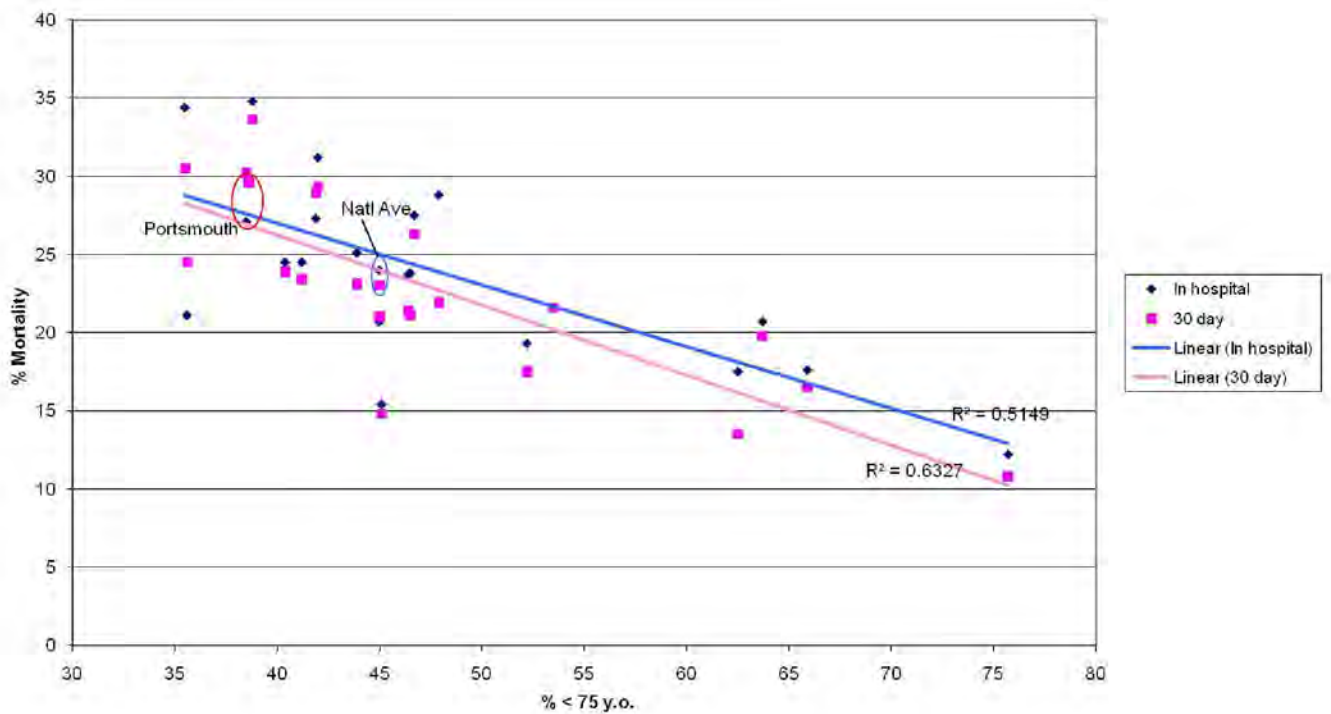
However, when comparing for number of admissions Portsmouth is close to the linear regression line for mortality:

Mortality vs Admissions - Transplant Units



When comparing for proportion of admissions under 75 years old (Portsmouth has a very low percentage) the mortality is on the linear regression line and better than a number of other centres who also have an elderly population:

Mortality vs % < 75 y.o. - Transplant Units



The current performance data suggests the situation persists:

Diagnostic Group	Spells	Superspells	% of all	Deaths	%	Expected	%	RR	Low	High
Acute and unspecified renal failure	63	62	0.2%	19	30.6%	14.1	22.7%	135	81.2	210.8

Report's Principal Recommendations with Actions for Discussion

Recommendation	Action
1. All patients admitted as an emergency, regardless of specialty, should have their electrolytes checked routinely on admission and appropriately thereafter. This will prevent the insidious and unrecognised onset of AKI.	ED/MAU/SAU clerking proformas to include electrolyte checking, recognition and management plans
2. Predictable and avoidable AKI should never occur. For those in-patients who develop AKI there should be both a robust assessment of contributory risk factors and an awareness of the possible complications that may arise. Early recognition of at risk patients should allow patient involvement in treatment limitation decisions before clinical condition deteriorates and the opportunity for this involvement is missed. Reagent strip urinalysis should be performed on all emergency admissions.	Junior doctor and nursing education re AKI, risks, recognition and basic management Reagent strips to be available and checking included in clerking
3. All acute admissions should receive adequate senior reviews (with a consultant review within 12 hours of admission as previously recommended by NCEPOD3). Treatment limitation decisions should be made with reference to guidance produced by the GMC and within the legislative framework of the Mental Capacity Act.	Rearrangement of acute pathway ongoing MCA already part of essential training
4. NCEPOD recommends that the guidance for recognising the acutely ill patient (NICE CG 50) is disseminated and implemented. In particular all acute patients should have admission physiological observations performed and a written physiological monitoring plan made, taking into account the degree of illness and risk of deterioration. Trusts need to put in place a mechanism to ensure that NICE guidance (CG 50) has been implemented. An audit of patients who suffer serious adverse events (cardiac arrest or unplanned admission to critical care) to assess compliance with NICE CG 50 should be presented to the Trust Clinical Governance Committee on an annual basis.	NICE CG 50 to be taught regularly at junior induction. ? ED/MAU/SAU clerking proforma ? mandatory training requirement for junior doctors ? SUI/RCA

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Recommendation	Action
5. There should be sufficient critical care and renal beds to allow rapid step up in care if appropriate. Every hospital should have a written guideline detailing how the three clinical areas where patients with AKI are treated (critical care unit, the renal unit and the nonspecialist ward) interact to ensure delivery of high quality, clinically appropriate care for patients with AKI.	Achieved unless medical pressures on beds MAU-G(I)M/Renal/DCC
6. All level 3 units should have the ability to deliver renal replacement therapy; and where appropriate these patients should receive clinical input from a nephrologist.	Achieved
7. All acute admitting hospitals should have access to either onsite nephrologists or a dedicated nephrology service within reasonable distance of the admitting hospital.	Achieved
8. When referral is made for specialist advice from nephrologists prompt senior advice and a review where appropriate is required. All patients with AKI should be promptly discussed by the renal registrar with their consultants.	Achieved
9. All acute admitting hospitals should have access to a renal ultrasound scanning service 24 hours a day including the weekends and the ability to provide emergency relief of renal obstruction.	USS available. No on-call nephrostomy service
10. Initial clerking of all emergency patients should include a risk assessment for AKI.	? ED/MAU/SAU clerking proforma

Report compiled by

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