

RECOMMENDATIONS

In the scope of the present study and after reviewing the previously published studies about this topic, we may recommend the following:

- Angiotensinogen could be used for predicting AKI in patients with severe sepsis.
- It should be measured multiple times during ICU stay for better prognostic accuracy.
- Multiple cut-off values should be evaluated to reach optimal threshold which could be particularly useful for screening patients who will meet the outcomes for enrollment in a clinical trial of early intervention.
- The study should be compared with other AKI biomarkers in ICU patients with other causes of AKI not only severe sepsis, but also all causes of AKI.
- Larger sample size and longer duration of study should be applied to reach optimum results.

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APPENDIX (1) ⁽¹⁴⁾

RIFLE and AKIN Criteria for Diagnosis and Classification of AKI

RIFLE			AKIN	
Class	SCr	Urine output (common to both)	Stage	SCr
Risk	Increased SCr to $\times 1.5$ baseline	Urine output < 0.5 mg/kg/h, For > 6 h	1	Increase in Cr ≥ 0.3 mg/dL or increase in SCr to $> 150\%$ - 200% of baseline
Injury	Increased SCr to $\times 2$ baseline	Urine output < 0.5 mg/kg/h, For > 12 hr.	2	Increase in SCr to $> 200\%$ - 300% of baseline
Failure	Increased SCr to $\times 3$ baseline; or an increase of ≥ 0.5 mg/dL to a value of ≥ 4 mg/dL	Urine output < 0.3 mg/kg/h, For > 12 h or anuria for > 12 h	3	Increase in SCr to $> 300\%$ of baseline; or to ≥ 4 mg/dL with an acute increase of ≥ 0.5 mg/dL; or on RRT
loss	Need for RRT for > 4 wk.			
End stage	Need for RRT for > 3 mo.			

RIFLE: Risk, Injury, Failure, Loss, End stage

AKIN: Acute Kidney Injury staging

AKI: Acute Kidney Injury

SCr.: Serum Creatinine

RRT: Renal Replacement Therapy

APPENDIX (2) ⁽¹⁴⁾

ACUTE KIDNEY INJURY SCORE

Stage	Serum creatinine	Urine output
1	1.5 to 1.9 times baseline <i>or</i> ≥ 0.3 mg/dl (≥ 26.5 $\mu\text{mol/l}$) increase	< 0.5 ml/kg/hour for 6 to 12 hours
2	2.0 to 2.9 times baseline	< 0.5 ml/kg/hour for ≥ 12 hours
3	3.0 times baseline <i>or</i> increase in serum creatinine to ≥ 4.0 mg/dl (≥ 353.6 $\mu\text{mol/l}$) <i>or</i> initiation of renal replacement therapy <i>or</i> in patients < 18 years a decrease in e GFR to < 35 ml/minute per 1.73 m ²	< 0.3 ml/kg/hour for ≥ 24 hours <i>or</i> anuria for ≥ 12 hours

E GFR, estimated glomerular filtration rate

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APPENDIX (4)⁽¹¹¹⁾

ACUTE PHYSIOLOGIC ASSESSMENT AND Chronic Health Evaluation (APACHE) II Scoring System

Physiologic Variable	High Abnormal Range					Low Abnormal Range					Points
	+4	+3	+2	+1	0	+1	+2	+3	+4		
Temperature - rectal (°C)	≥41°	39 to 40.9°		38.5 to 38.9°	36 to 38.4°	34 to 35.9°	32 to 33.9°	30 to 31.9°	≤29.9°		
Mean Arterial Pressure - mm Hg	≥160	130 to 159	110 to 129		70 to 109		50 to 69		≤49		
Heart Rate (ventricular response)	≥180	140 to 179	110 to 139		70 to 109		55 to 69	40 to 54	≤39		
Respiratory Rate (non-ventilated or ventilated)	≥50	35 to 49		25 to 34	12 to 24	10 to 11	6 to 9		≤5		
Oxygenation: A-aDO ₂ or PaO ₂ (mm Hg) a. FIO ₂ ≥0.5 record A-aDO ₂ b. FIO ₂ <0.5 record PaO ₂	≥500	350 to 499	200 to 349		<200 PO ₂ >70						
Arterial pH (preferred)	≥7.7	7.6 to 7.69		7.5 to 7.59	7.33 to 7.49		7.25 to 7.32	7.15 to 7.24	<7.15		
Serum HCO ₃ (venous mEq/l) (not preferred, but may use if no ABGs)	≥52	41 to 51.9		32 to 40.9	22 to 31.9		18 to 21.9	15 to 17.9	<15		
Serum Sodium (mEq/l)	≥180	160 to 179	155 to 159	150 to 154	130 to 149		120 to 129	111 to 119	≤110		
Serum Potassium (mEq/l)	≥7	6 to 6.9		5.5 to 5.9	3.5 to 5.4	3 to 3.4	2.5 to 2.9		<2.5		
Serum Creatinine (mg/dl) Double point score for acute renal failure	≥3.5	2 to 3.4	1.5 to 1.9		0.6 to 1.4		<0.6				
Hematocrit (%)	≥60		50 to 59.9	46 to 49.9	30 to 45.9		20 to 29.9		<20		
White Blood Count (total/mm ³) (in 1000s)	≥40		20 to 39.9	15 to 19.9	3 to 14.9		1 to 2.9		<1		
Glasgow Coma Score (GCS) Score = 15 minus actual GCS											
A. Total Acute Physiology Score (sum of 12 above points)											
B. Age points (years) ≤44=0; 45 to 54=2; 55 to 64=3; 65 to 74=5; ≥75=6											
C. Chronic Health Points (see below)											
Total APACHE II Score (add together the points from A+B+C)											

Interpretation of Score:

Score	DeathRate (%)
0-4	4
5-9	8
10-14	15
15-19	25
20-24	40
25-29	55
30-34	75
>34	85

APPENDIX (5) ⁽¹¹²⁾

Sofa score

Organ system	1	2	3	4
Respiratory PaO ₂ /FiO ₂ , (mmHg)	<400	<300	<200	<100
Hematologic Platelets/ nl	<150	<100	<50	<20
Hepatic Bilirubin, mg/dl (μ mol/l)	1,2–1,9 (20–32)	2,0–5,9 (33–101)	6,0–11,9 (102–204)	>12,0 (>204)
Cardiovascular Hypotension	MAP ²⁾ <70 mmHG	Dopamine $\leq 5^{1)}$ or dobutamine (any dose)	Dopamine >5 or epinephrine $\leq 0,1^{1)}$ or Norepinephrine $\leq 0,1^{1)}$	Dopamine >15 epinephrine > 0 or norepinephrine 0,1
Neurologic Glasgow Coma Score	13–14	10–12	6–9	<6
Renal Creatinine, mg/dl (μ mol/l) urine output	1,2–1,9 (110–170)	2,0–3,4 (171–299)	3,5–4,9 (300–440) <500 ml/day	>5,0 (>440) <200 ml/day

Sequential Organ Failure Assessment

The SOFA score is a scoring system to determine the extent of a person's organ function or rate of failure. The score is based on six different scores, one each for the respiratory, cardiovascular, hepatic, coagulation, renal and neurological systems.

Both the mean and highest SOFA scores being predictors of outcome. An increase in SOFA score during the first 24 to 48 hours in the ICU predicts a mortality rate of at least 50% up to 95%. Scores less than 9 give predictive mortality at 33% while above 11 can be close to or above 95%

الملخص العربي

الانجيوتنسينوجين في البول كمتنبئ محتمل للقصور الكلوي الحاد في التعفن الشديد

ان القصور الكلوي الحاد هو من المضاعفات المتكررة والخطيرة للتسمم في مرضى وحدة العناية المركزة وعلاوة على ذلك ، هناك أدلة قوية على أن التعفن والصدمة التعفنيه هي أهم أسباب القصور الكلوي الحاد في المرضى ذوي الحالات الحرجة ، مسؤولة عن ٥٠ ٪ أو أكثر من حالات القصور الكلوي الحاد في العناية المركزه .

لذلك ، فالنتبؤ المبكر بحالات القصور الكلوي لحاد في مرضي العناية المكتفه أمر بالغ الأهمية، وذلك باستخدام المؤشرات الحيوية المبكره مثل مستوى الأنجيوتنسينوجين البولي الذي يرتبط مع مستويات الأنجيوتنسين داخل الكلية و الأنجيوتنسين ٢ الذين يلعبوا دورا رئيسيا في الآليات الجزيئية للقصور الكلوي الحاد.

وكان الهدف من هذا العمل هو تقييم دور الأنجيوتنسينوجين البولي باعتباره متنبئ محتمل للقصور الكلوي الحاد في المرضى الذين يعانون من التسمم الحاد.

أجرينا دراسة وصفية مستقبلية خلال الفترة من يناير ٢٠١٤ إلى ديسمبر ٢٠١٤ علي مائه (١٠٠) من المرضى البالغين من الجنسين الذين يعانون من التسمم الحاد، وتم تصنيف المرضى إلى مجموعتين وفقا لتطور القصور الكلوي الحاد. المجموعة الغير المصابه بالقصور الكلوي الحاد التي تتألف من ٣٠ مريضا (المجموعة الأولى)، والمجموعة المصابه بالقصور الكلوي الحاد التي تتألف من ٧٠ مريضا (المجموعة الثانية). وأدرج في الدراسة المرضى الذين كان لديهم معايير تعفن الدم الحاد واستبعد الذين كان لديهم مرض مزمن في الكلى او يتلقوا استبدال العلاج الكلوي أو لديهم صدمه التعفن .

وكانت المجموعة الأولى و المجموعة الثانية متجانسة من حيث الحجم و الخصائص الديموغرافية و الظروف الموجودة مسبقا ، و موقع الإصابة مع عدم وجود فروق ذات دلالة إحصائية بينهما. و بعد أخذ الموافقة المسبقة من كل مريض أو من ذوي القربي، تم أخذ التاريخ المرضي المفصل والفحص السريري الكامل و التحاليل المعملية الشامله لكل المرضي لتأكيد التشخيص من التعفن الشديد.

وتم سحب عينه الأنجيوتنسينوجين و الكرياتينين البولي مرة واحدة من كل مريض في يوم دخول المستشفى وذلك لحساب نسبه الأنجيوتنسينوجين البولي/ الكرياتينين البولي (نانوغرام / ملغ) و مقارنتها مع مستوى الكرياتينين في الدم التي تسحب يوميا .

وفي النهاية أثبتت نتائج هذه الدراسة أن:

- هناك ارتباط كبير بين المجموعات المدروسة ونسبه الأنجيوتنسينوجين البولي / الكرياتينين البولي ، في حين لم يكن هناك أي دلالة إحصائية بين المجموعات المدروسة و الكرياتينين في البلازما.
- وعلاوة على ذلك ، كان هناك ارتباط إيجابي بين نسبه الأنجيوتنسينوجين البولي/ الكرياتينين البولي و تطور الاصابه بالقصور الكلوي الحاد و مستوى الكرياتينين بالبلازما لجميع المرضى في جميع في الأيام المتابعة، مع أعلى ارتباط في اليوم الخامس من متابعة .
- وعلي الصعيد الاخر بالنسبه للمجموعة الثانية (التي تطورت لقصور كلوي حاد) ، لم تتنبأ نسبه الأنجيوتنسين البولي / الكرياتينين بحاجة المرضى لعلاجات لرفع الضغط أو زيادة مدة الإقامة في المستشفى لأكثر من ٧ أيام، ولكنها تنبأت ايجابيا بحاجة المرضى لعلاج كلوي بديل و بحالات الوفاة من بين مرضي القصور الكلوي.

وبحلول نهاية هذه الدراسة، وصلنا إلى استنتاج مفاده أن الأنجيوتنسينوجين البولي ليس فقط من العلامات البيولوجية الواعدة جديدة في التنبؤ المبكر بمرضى القصور الكلوي الحاد لذوي التسمم الحاد ولكن أيضا يمكن استخدامه للتنبؤ بالنتائج بين هؤلاء المرضى .



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رسالة

مقدمة لقسم الطب الحرج
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ضمن متطلبات درجة

الماجستير في الطب الحرج

من

محمد إبراهيم عبد الحميد محمد

بكالوريوس الطب والجراحة، ٢٠٠٧

كلية الطب
جامعة الإسكندرية

٢٠١٥

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مدرس الباثولوجيا الاكلينيكية والكيميائيه
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