Incidence and Risk Factors of Postoperative Acute Kidney Injury in Egyptian Patients: A Single Center Analytical Cross-Sectional Study

Said Sayed Ahmed Khamis[1], Abdelsalam El Sayed Abdelsalam Sherif*[1], Heba El Sayed Kasem[1], Mahmoud Said Abdelhalim[2], Mohamed Kamel Shabaan[1]

Departments of [1]Internal Medicine and [2]General Surgery, Faculty of Medicine, Menofia University, Egypt

***Corresponding author:** Abdelsalam El Sayed Abdelsalam, **Mobile:** (+20) 01021308667,

E-mail: abdelsalam.sherif@med.menofia.edu.eg

ABSTRACT

Background: Postoperative Acute Kidney Injury (PO-AKI) poses a substantial risk to patients, impacting their prognosis.

Objectives: Assessing the incidence of AKI within the first 72 hours after surgery according to Kidney Disease: Improving Global Outcomes (KDIGO) criteria and to assess preoperative, intraoperative and postoperative risk factors for the development of PO-AKI.

Patients and Methods: We conducted an analytical cross sectional study in patients undergoing major surgery more than 2-hour duration. The recruited patients were divided into two groups, one group that developed PO-AKI and the other group that didn't develop PO-AKI. The primary endpoint was the occurrence of PO-AKI within 72 hours of surgery defined by the KDIGO criteria. Secondary endpoints included PO-AKI severity and duration, use of renal replacement therapy (RRT), mortality, Intensive Care Unit (ICU) and Hospital length of stay.

Results: This study included 498 patients. 101 of 498 (20.28%) patients developed PO-AKI within 72 hours after surgery (primary endpoint; stage 1: 40 (39.6%), stage 2: 39 (38.6%), stage 3: 22 (21.8%). Patients with PO-AKI had significantly longer ICU (mean 3.15 days vs. 0.48 days) as well as hospital length of stays (mean 9.17 days vs. 5.15 days), higher mortality rates (5.9% vs. 0.8% compared to non-PO-AKI patients. Multivariate analysis revealed that (BMI >28.39, hypertension, surgery duration>3.19 h, intraoperative hypotension, preoperative NSAID and intraoperative nephrotoxic drugs were significant risk factor for developing postoperative AKI.

Conclusion: One in five patients were at risk for the development of PO-AKI. Intraoperative hypotension, surgery duration and preoperative NSAIDs were risk factors for PO-AKI. Patients with PO-AKI had considerably higher mortality rates, ICU admissions, and hospital stays.

Keywords: PO- AKI, ICU, KDIGO, Egyptian patients.

INTRODUCTION

AKI, formerly known as acute renal failure, is a serious illness marked by an abrupt deterioration in kidney function **(1)**. Because surgical procedures and related variables can lead to the development of AKI, it is a serious issue for postoperative patients **(2)**. Postoperative AKI poses a substantial risk to patients, impacting their recovery, length of hospital stay, and overall prognosis **(3)**. Therefore, understanding the causes, risk factors, and management of AKI in the postoperative setting is of paramount importance **(1)**.

Postoperative AKI can arise from various factors, including reduced blood supply to the kidneys, direct kidney injury, and exposure to nephrotoxic substances **(3,4)**. Surgical procedures that involve significant blood loss, prolonged anesthesia, or the use of contrast agents can compromise renal perfusion and contribute to AKI development **(4)**. Additionally, in the postoperative phase, underlying comorbidities including diabetes, hypertension, and chronic renal disease might raise the risk of AKI even more **(1,2,4)**.

Every year, more than 300 million individuals have major surgery that may result in AKI **(3)**. However, the precise frequency of surgery-related PO-AKI is yet uncertain **(3,5)**. Early recognition and prompt management of postoperative AKI are crucial for improving patient outcomes **(3)**. Healthcare providers must monitor patients closely for signs of kidney dysfunction, including changes in urine output and laboratory markers like s. creatinine and blood urea nitrogen levels **(2,4)**. Timely intervention can help mitigate further kidney damage and potentially reverse the AKI process **(2)**. Treatment strategies may involve optimizing hemodynamic stability, adjusting fluid balance, managing medications, and addressing underlying causes **(1,2)**.

Lack of awareness of PO-AKI occurrence is problematic because it might result in underestimating the danger of PO-AKI in this area, the burden it places globally, and the failure to recognize risk factors for its emergence. This study's objective was to assess the incidence of AKI within the first 72 hours after surgery according to KDIGO criteria (including the distribution of stages) and to assess preoperative, intraoperative and postoperative risk factors for the development of postoperative AKI.

PATIENTS AND METHODS

This is an analytical cross-sectional study that was carried out from February 2024 to August 2024 at Menofia University Hospitals on all adult patients undergoing major surgery at General Surgery Department. We included all adult patients aged ≥18 years, undergoing major surgery for at least 2 hours and were planned or not planned for admission in ICU or a similar high dependency unit after surgery at General Surgery Department in Menoufia University Hospitals.

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The excluded patients included who had pre-existing AKI within the last 3 months, end-stage renal disease with dialysis dependency, and kidney transplantation.

All patient's data that were analyzed included age, gender, height, weight and body mass index (BMI), in addition to the associated comorbidities as hypertension, atrial fibrillation/flutter, previous myocardial infarction, Congestive heart failure according to New York Heart Association (NYHA) classification[6], diabetes mellitus, chronic obstructive pulmonary disease (COPD), chronic kidney disease, peripheral vascular disease and Previous stroke. The complete operative data were collected during preoperative period, included the medications as aspirin, angiotensin converting enzyme inhibitors (ACE) inhibitors or angiotensin-receptor blockers (ARBs), beta-blockers (BB), diuretics, nonsteroidal anti-inflammatory drugs (NSAIDs) except aspirin, Statins, vasopressors and use of contrast media on week prior to surgery.

While intraoperative, surgical specialty, type of surgery, duration of surgery, replacement fluid included (crystalloids, colloids, blood products), urinary output, any episodes of hypotension with mean arterial pressure <55 mm Hg for more than 5 min, application of vasopressors, contrast or diuretics, all these data were collected and statistically analyzed.

Postoperative data included follow up of fluid replacement (crystalloids, colloids, blood products), urinary output, application of vasopressors, nephrotoxic agents or diuretics. AKI was diagnosed according to KDIGO Classification [7].

Secondary outcome, was considered according to duration of AKI, requiring renal replacement therapy, serum creatinine level at hospital and ICU discharge, discharge date of hospital and ICU and the discharge mortality outcome, and if the patient was alive or dead.

Ethical approval:

The Ethics Committee of the Menoufia Faculty of Medicine has given its approval to this project. Each participant completed a permission form when all information was received. Throughout its implementation, the study complied with the Helsinki Declaration.

Statistical analysis

Data were tabulated and analyzed using SPSS version 26.0. Descriptive statistics were presented as numbers and percentages (No and %) for qualitative data or mean± SD for normally distributed quantitative data, and median (IQR) for non-normally distributed quantitative data. To investigate the relationship between two qualitative variables, the Pearson X^2-test was employed. Student t test (t) or Mann-Whitney U Test (Z), was used to compare two quantitative variables that were regullarly or not regularly distributed respectively. Logistic regression was conducted to determine the predictors of developing postoperative AKI and developing CKD in patients who developed postoperative AKI. P-values below 0.05 were regarded as statistically significant.

RESULTS

This is an analytical cross-sectional study, which included 583 patients from the General Surgery Department over six months, 85 patients were excluded, 498 patients were included (Figure 1), their mean of age was 58.1 years. 271 (54.4%) were females. Overall, 101 (20.28%) of our patients developed PO-AKI within 72 hours after surgery (Figure 2). Primary endpoints were KDIGO I: 40 (39.6%), KDIGO II: 39 (38.6%), and KDIGO III: 22 (21.8%) (Figure 3).

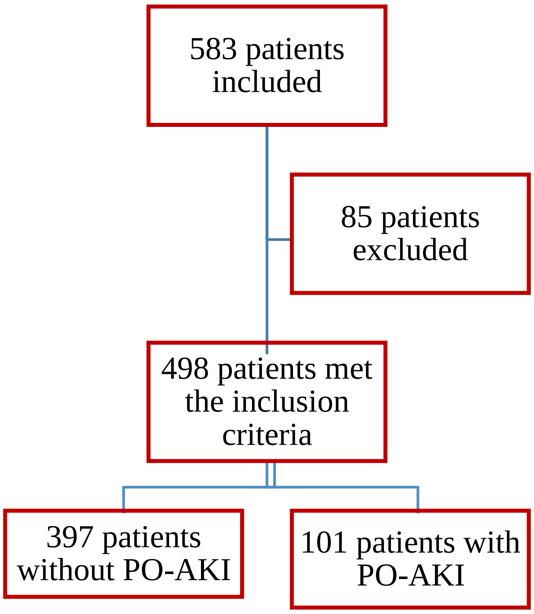


Figure (1): Flow chart PO-AKI postoperative AKI.

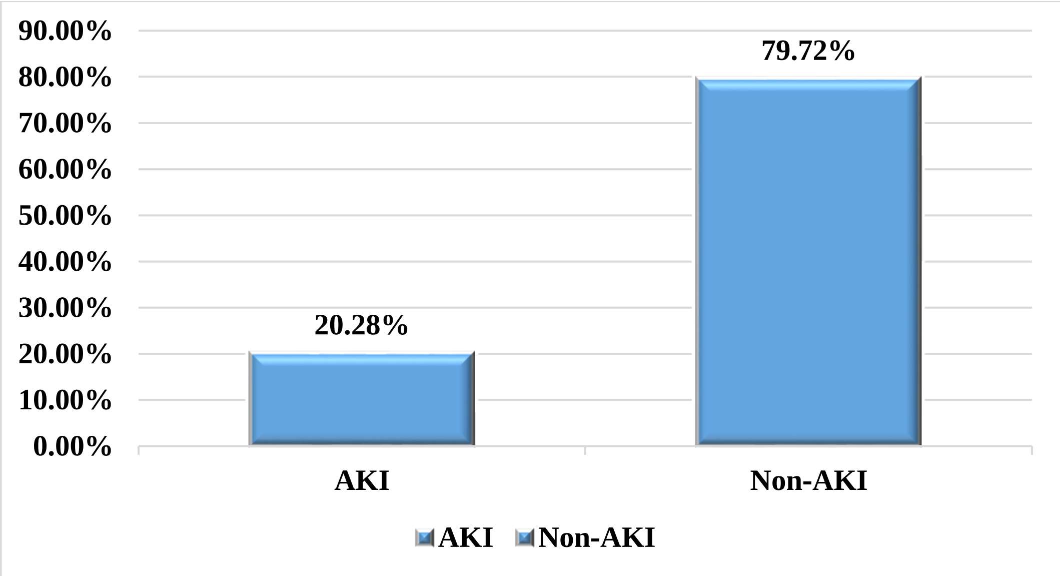
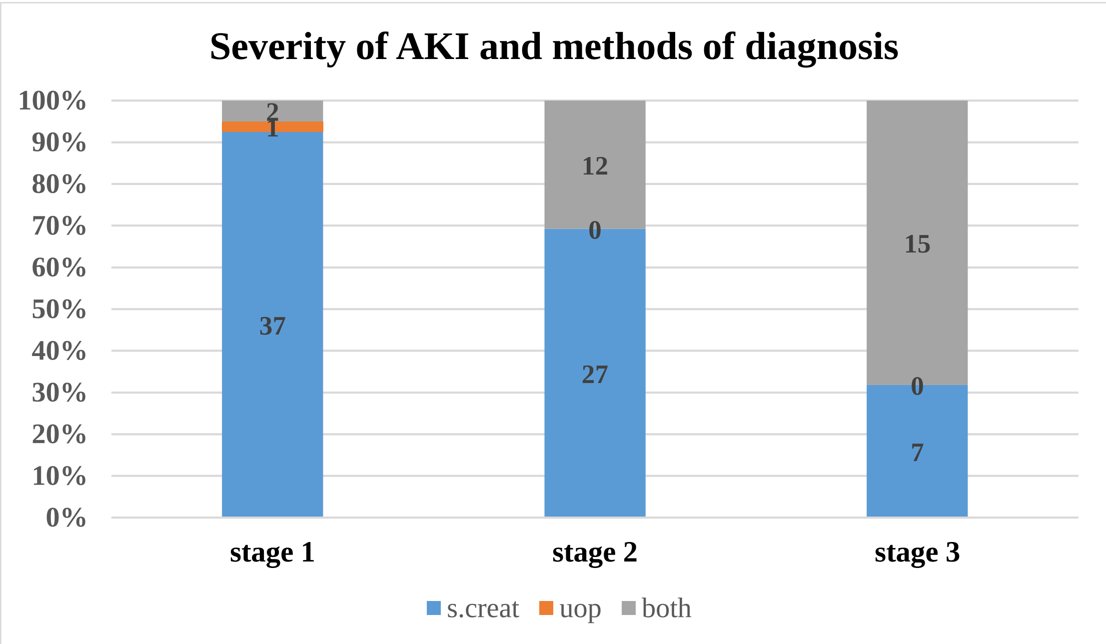


Figure (2): Incidence of AKI.



s. creat; serum creatinine, uop; urine output

Figure (3): Severity of AKI and methods of diagnosis.

Risk factors assessment for PO-AKI:

Compared to non-AKI patients, the patients that developed postoperative AKI were older. They had higher mean of BMI and basal creatinine, with higher percentage of patients having GFR<60 ml/min. They also had relatively more other comorbidities as HTN and congestive heart failure. Furthermore, the patient's medication as ACE/ARBs, B-blockers, diuretics, and NSAIDs increased the incidence of PO-AKI (Table 1).

Table (1): Comparison between the AKI and non-AKI patients regarding the patient demographics and baseline characteristics.

Data		Non -AKI patients (n=397)	AKI patients (n=101)	Test of significance	P-value
Baseline characteristics					
Age years (mean ± SD)		56.74±8	63.48±7.26	t=8.15	**P<0.001***
Sex **Male** **Female**		 186(46.9%) 211(53.1%)	 41(40.6%) 60(59.4%)	$\chi2$=1.27	P=0.260
BMI kg/m^2 (mean ± SD)		28.19±2.78	29.16±3.60	t=2.93	**P=0.004***
Baseline creatinine (mg/dl) (mean ± SD)		0.98±0.16	1.08±0.17	t=5.71	**P<0.001***
Comorbidities					
Hypertension	**Yes** **No**	196(49.4%) 201(50.6%)	67(66.3%) 34(33.7%)	$\chi2$=9.30	**0.002***
Previous MI	**Yes** **No**	79(19.9%) 318(80.1%)	27(26.7%) 74(73.3%)	$\chi2$=2.24	0.136
AF-Flutter	**Yes** **No**	38(9.6%) 359(90.4%)	16(15.8%) 85(84.2%)	$\chi2$=3.27	0.075
Congestive HF	**Yes** **No**	63(15.9%) 334(84.1%)	30(29.7%) 71(70.3%)	$\chi2$=10.14	**0.001***
HF NYHA stage	**I** **II** **III**	40 18 5	12 11 7	$\chi2$=6.17	**0.046***
DM	**Yes** **No**	147(37%) 250(63%)	46(45.5%) 55(54.4%)	$\chi2$=2.46	0.137
COPD	**Yes** **No**	77(19.4%) 320(80.6%)	25(24.8%) 76(75.2%)	$\chi2$=1.41	0.269
CKD (eGFR < 60 ml/min)	**Yes** **No**	15(3.8%) 380(96.2%)	12(11.9%) 89(88.1%)	$\chi2$=10.21	**0.001***
Peripheral vascular disease	**Yes** **No**	63(15.9%) 334(84.1%)	17(16.8%) 84(83.2%)	$\chi2$=0.05	0.879
Previous stroke	**Yes** **No**	80(20.2%) 317(79.8%)	22(21.8%) 79(78.2%)	$\chi2$=0.13	0.782
Medications					
Aspirin	**Yes** **No**	129(32.5%) 268(67.5%)	43(42.6%) 58(57.4%)	$\chi2$=3.62	0.057
ACE I/ARBS	**Yes** **No**	154(38.8%) 243(61.2%)	52(52%) 48(48%)	$\chi2$=5.74	**0.017***
BB	**Yes** **No**	82(20.9%) 310(79.1%)	37(36.6%) 64(63.4%)	$\chi2$=10.83	**0.002***
Diuretics	**Yes** **No**	86(21.7%) 311(78.3%)	49(48.5%) 52(51.5%)	$\chi2$=29.38	**<0.001***
NSAID	**Yes** **No**	235(59.2%) 162(40.8%)	85(84.2%) 16(15.8%)	$\chi2$=21.84	**<0.001***
Statin	**Yes** **No**	157(39.5%) 240(60.5%)	38(37.6%) 63(62.4%)	$\chi2$=0.12	0.819
Vasopressors	**No**	397(100%)	101(100%)	0	1
Contrast media, one week before surgery	**Yes** **No**	54(13.6%) 343(86.4%)	19(18.8%) 82(81.2%)	$\chi2$=1.74	0.207

SD: standard deviation, t: student t test, $\chi2$: chi-squared test, *: statistically significant.; ACEi, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; AF, atrial fibrillation; BB, beta blockers; BMI, body mass index; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; DM, diabetes mellitus; eGFR, estimated glomerular filtration rate; HF, heart failure; MI, myocardial infarction; NSAID, Nonsteroidal anti-inflammatory drug; NYHA; New York Heart Association.

PO-AKI was most frequent in patients undergoing abdominal surgery, followed by oncology and vascular surgery (Table 2). The postoperative administration of blood products and intraoperative administration of contrast, diuretics and any episode of hypotension, in addition to vasopressor were associated with increased risk of AKI (Table 2 and 3).

Table (2): Comparison between the AKI and non-AKI patients regarding the intraoperative data of the patient

Data		Non-AKI patients (n=397)	AKI-patients (n=101)	Test of significance	P-value
Type of surgery	**Emergency** **Elective**	19(4.8%) 378(95.2%)	7(6.9%) 94(93.1%)	χ2=0.74	0.450
Surgical specialty	**General** **Abdominal** **Vascular** **Oncology**	 183(46.1%) 58(14.6%) 156(39.3%)	 40(39.6%) 28(27.7%) 33(32.7%)	χ2=9.71	**0.008***
Surgery duration (h)	**(mean ±SD)**	3.15±0.91	3.37±0.93	t=2.19	**0.030***
Crystalloids	**Yes**	397(100%)	101(100%)	0	1
Colloids	**Yes** **No**	46(11.6%) 351(88.4%)	38(37.6%) 63(62.4%)	χ2=38.92	**<0.001***
Blood products	**Yes** **No**	5(1.3%) 392(98.7%)	9(8.9%) 92(91.1%)	χ2=17.25	**<0.001***
Episodes of hypotension	**Yes** **No**	72(18.1%) 325(81.9%)	68(67.3%) 33(32.7%)	χ2=96.40	**<0.001***
Vasopressor	**Yes** **No**	25(6.3%) 372(93.7%)	28(27.7%) 73(72.3%)	χ2=38.86	**<0.001***
Contrast	**Yes** **No**	3(0.8%) 394(99.2%)	14(13.9%) 87(86.1%)	χ2=41.94	**<0.001***
Diuretics	**Yes** **No**	0 397(100%)	7(6.9%) 94(93.1%)	χ2=27.9	**<0.001***

SD: standard deviation, t: student t test, χ2: chi-squared test, *: statistically significant.

Table (3): Comparison between the AKI and non-AKI patients regarding the postoperative medication of the patient

Data		Non-AKI patients (n=397)	AKI-patients (n=101)	Test of significance	P-value
Crystalloids	**Yes** **No**	397(100%) 0	99(98%) 2(2%)	χ2=7.89	**0.005***
Colloids	**Yes** **No**	22(5.5%) 375(94.5%)	23(22.8%) 78(77.2%)	χ2=29.08	**<0.001***
Blood products	**Yes** **No**	22(5.5%) 375(94.5%)	52(51.5%) 49(48.5%)	χ2=134.33	**<0.001***
Vasopressor	**Yes** **No**	36(9.1%) 361(90.9%)	33(32.7%) 68(67.3%)	χ2=37.58	**<0.001***
NSAIDs	**Yes** **No**	206(51.9%) 191(48.1%)	16(15.8%) 85(84.2%)	χ2=42.34	**<0.001***
Diuretics	**Yes** **No**	31(7.8%) 366(92.2%)	37(36.6%) 64(63.4%)	χ2=56.74	**<0.001***

*: Statistically significant.

The univariate analysis revealed that the patients older than 58 years, BMI more than 28.39 were more valuable for the development of AKI in concurrent to vascular surgery with surgical duration more than three hours. The CKD patients with baseline creatinine more than1 mg/dl associated with other comorbidities as hypertension and congestive HF were considered as risk factors for the development of postoperative AKI. Drugs prescription preoperatively as ACE/ARBS, BB, diuretics and NSAID, and intraoperative nephrotoxic drugs had a main role in the development of AKI. Our analytic results showed that the intraoperative blood products, episodes of hypotension and intraoperative vasopressor, all were significant risk factor for developing postoperative AKI (Table 4).

Further multivariate analysis revealed that, the most dependant risk factors for developing postoperative AKI were utilizing the intraoperative contrast followed by the exposure to any episodes of intraoperative hypotension. furthermore, preoperative NSAID, BMI >28.39, hypertension, surgery duration >3.19 hours; all were independent risk factors for the development of postoperative AKI (Table 4).

Table (4): The univariate and the multivariate analysis for the preoperative and intraoperative predictor of developing AKI predictors.

Variable	Univariate analysis			Multivariate analysis		
	B	OR (95%CI)	P-value	B	OR (95%CI)	P-value
Age (>58 Y)	1.39	4.04 (2.54, 6.43)	**<0.001***	0.45	1.57 (0.74, 3.32)	0.331
BMI (>28.39)	0.89	2.44 (1.56, 3.81)	**<0.001***	1.96	7.11 (3.71, 15.95)	**<0.001***
Baseline creatinine (>1 mg/d)	1.05	2.87 (1.83, 4.49)	**<0.001***	0.68	1.98 (0.97, 4.04)	0.059
Hypertension (yes)	0.70	2.02 (1.27, 3.19)	**0.003***	1.61	5.04 (2.14, 11.88)	**<0.001***
Congestive HF	0.81	2.24 (1.35, 3.71)	**0.002***	0.06	1.06 (0.393, 2.89)	0.900
CKD	1.22	3.41 (1.54, 7.55)	**0.002***	0.61	1.84 (0.56, 6.02)	0.311
ACE I/ARBS (yes)	0.53	1.71 (1.10, 2.65)	**0.017***	0.30	0.73 (0.30, 1.77)	0.497
BB (yes)	0.78	2.18 (1.36, 3.51)	**0.001***	0.25	1.29 (0.63, 2.63)	0.475
Diuretics preoperative (yes)	1.22	3.41 (2.15, 5.38)	**<0.001***	0.06	1.07 (0.41, 2.79)	0.887
preoperative NSAID (yes)	1.29	3.66 (0.15, 0.48)	**<0.001***	2.23	9.31 (0.04, 0.31)	**<0.001***
Surgical specialty						
General. Abdominal	0.03	1.03 (2.28, 0.62)	0.899	0.10	0.89 (0.98, 0.33)	0.832
Vascular	0.82	1.26 (1.71, 4.10)	**0.006***	0.01	0.47 (2.40, 2.05)	0.964
Oncology(ref)						
Surgery duration (h) (>3.19 h)	0.80	2.23 (1.41, 3.52)	**0.001***	1.22	3.41 (1.57, 7.40)	**0.002***
Intraoperative colloids (yes)	1.03	1.03 (2.06, 0.73)	**<0.157**	0.08	0.919 (0.39, 2.11)	0.842
Intraoperative blood products (yes)	2.03	7.67 (2.52, 23.42)	**<0.001***	0.55	1.74 (0.39, 7.67)	0.461
Episodes of hypotension (yes)	2.23	9.30 (5.71, 15.15)	**<0.001***	2.59	13.40 (5.46, 32.88)	**<0.001***
Intraoperative Vasopressor (yes)	1.74	5.70 (3.14, 10.34)	**<0.001***	0.53	0.58 (0.229, 1.50)	0.268
Intraoperative contrast (yes)	3.05	21.13 (5.94, 75.13)	**<0.001***	3.72	41.40 (7.13, 240.27)	**<0.001***

Using the best cut-off levels for the quantitative variable (mean for normally distributed and median for non – normally distributed variables), OR: odds ratio, *statistically significant.; ACEi angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; BB, beta blockers; BMI, body mass index; CKD, chronic kidney disease; HF, heart failure; NSAID, Nonsteroidal anti-inflammatory drug.

Secondary endpoint:

In total, none of the PO-AKI patients were treated with RRT during their hospital stay. Patients with PO-AKI had significantly longer ICU as well as hospital length of stay, higher mortality rates compared to non-PO-AKI patients (Table 5).

Table (5): The outcome of the patients.

Data		Non-AKI patients (n=397)	AKI patients (n=101)	Test of significance	P-value
Hospital stays duration (days)	**Mean ±SD**	5.15±1.58	9.17±2.83	t=18.79	**<0.001***
ICU duration (days)	**Median (IQR)**	1(2)	2 (5)	Z=7.25	**<0.001***
Condition at discharge	**Alive** **Died**	394(99.2%) 3(0.8%)	95(94.1%) 6(5.9%)	$\chi2$=12.19	**<0.001***
S. Creatinine at discharge (mg/dl)	**Mean ±SD**	1.02±0.20	1.38±0.23	Z=3.47	**<0.001***
Duration of AKI [Median (IQR) days]		4.00(3-6)			

SD: standard deviation, t: student t test, z: Mann-Whitney U Test, $\chi2$: chi-squared test, *: statistically significant. ICU; intensive care unit, IQR: inter quartile range.

DISCUSSION

This study's objectives were to evaluate preoperative, intraoperative, and postoperative risk factors for the development of postoperative AKI as well as the incidence of AKI during the first 72 hours following surgery according on KDIGO criteria (including the distribution of stages). It demonstrated that PO-AKI affects around one in five individuals during the perioperative phase. Patients undergoing vascular surgery were frequently impacted. Additionally, our study discovered that preoperative NSAIDs, length of surgery, and intraoperative hypotension were risk factors for PO-AKI. Lastly, individuals with PO-AKI had considerably higher rates of death as well as length of stay in the intensive care unit and hospital.

Large differences in PO-AKI rates have been shown in previous research; rates in major abdominal surgery range from 1.8% to 39.3% [8,9], whereas rates in cardiac surgery range from 3.1% to 39.9% [10]. These discrepancies arise because of variances in definitions and surgical kinds (for example, some studies only include hepatobiliary surgery [9], while others include all major abdominal surgery types) [4].

Zarbock *et al.* [3] studied all sorts of major operations, both cardiac and non-cardiac, and the total risk of PO-AKI was 18.4%. Our study included major surgeries of general/abdominal, the total rate of PO-AKI in vascular and oncology procedures was 20.28% when applying both KDIGO criteria based on serum creatinine and urine output.

Also, in a study **Wu *et al.*** [11] published in 2016 in Taiwan, the total rate of PO-AKI was around 30% higher than the rate in our study due to the characters of the patients being of high risk, admitted in ICU, and various types of surgeries. In another study, **Hobson *et al.*** [12] published in 2015 in Florida that the overall rate of PO-AKI was approximately 39%, which is also higher and that could also be attributed to the condition of the patients involved in the research as they all were critical requiring ICU postoperatively.

The estimated death rates for postoperative patients in the AKI group are around 5.9%, compared to 0.8% in the non-AKI group; in comparison to the EPIS-AKI trial, the mortality rates were roughly 3% [3]. This disparity in fatality rates can be attributed to significant geographical variances in the types of procedures performed as well as the identification of higher risk patients.

Also, in comparison with another study by **Wu *et al.*** [11] about the incidence and mortality in PO-AKI, it was found to be 11.6%, with a greater fatality rate than in our study, and that might be due to their selection of high-risk patients who were hospitalized in the ICU. In **Hobson *et al.*** [12] study, the participants with AKI had a greater in-hospital death rate (47.9% vs. 6.8%) than the subjects without AKI. Because the study is retrospective and involves patients in an intensive care unit, there may be lingering confounding variables that might reduce the calculated selection probabilities between the length of AKI and in-hospital death.

In the context of PO-AKI, prevention is crucial. But the pathophysiology of AKI is quite complicated, particularly when it comes to the perioperative period. Comorbidities and advanced age are two examples of risk factors that cannot be changed. Some risk factors, nevertheless, could be changeable. For instance, our multivariable analysis revealed that intraoperative contrast, intraoperative hypotension, and the administration of nephrotoxic agents—particularly preoperative NSAIDs—were risk factors for AKI. By identifying patients who are at risk for AKI, notifying the surgical team, and giving these patients priority, operative parameters including operation time can be changed. The univariate analysis revealed that patient aged more than 58 years with BMI more than 28.39, baseline creatinine above 1 mg/dl, hypertension, congestive HF, CKD, ACE I/ARBS, BB, preoperative diuretics, vascular surgery, surgery duration>3.19h, intraoperative blood products, intraoperative blood loss, episodes of hypotension, preoperative NSAID, intraoperative vasopressor, and intraoperative nephrotoxic drugs; all were significant risk factor for developing postoperative AKI.

The multivariate analysis revealed that the most dependant risk factors for developing postoperative AKI are utilizing the intraoperative contrast, followed by the exposure to any episodes of intraoperative hypotension. Furthermore, preoperative NSAID, BMI >28.39, hypertension and surgery duration more than three hours, all are independent risk factors for the development of postoperative AKI. According to EPSI-AKI, risk factors for PO-AKI included male sex, advanced age, a high percentage of health expenditure, hypertension, atrial fibrillation, congestive heart failure, diabetes, COPD, CKD, a high American Society of Anesthesiologists (ASA) score, emergency procedures, prolonged surgery, specific types of surgery, cell saver, transfusion, positive fluid balance, intraoperative complications like bleeding and pulmonary complications, aminoglycosides, and intraoperative use of vasopressors [3].

In a study conducted in turkey in 2014, AKI was found to be independently predicted by age, diabetes, and revised cardiac risk index (RCRI) score using multivariate analysis [13]. In a univariate study, **Abelha *et al.*** [14] found age, ASA physical status, emergency surgery, high risk surgery, ischemic heart disease, CHD, and RCRI score as independent preoperative predictors of AKI in the postoperative period. In addition, their multivariate analysis found ASA physical status, RCRI score, high risk surgery, and CHD as preoperative predictors of AKI in the postoperative period [14].

This study has the limitation of being an observational study with small number of patients; also, it covers only 3 surgical specialties in general surgery department while there are other surgical specialties and various risk factors. It needs to be multicenter for proper representation of population. It lacks further data on vasopressors, nephrotoxins and fluids. It also lacks long term follow up regarding morbidity and mortality.

The point of strength in our study is that it is considered the first study focusing mainly on PO-AKI using both S. creatinine and urine output of KDIGO classification in Egypt. Thus, it provides important data on the rate, morbidity, mortality and risk factors of PO-AKI.

CONCLUSION

Postoperative AKI is a rather common finding affecting almost one fifth of our studied patients. We noticed that there was cluster of cases of PO-AKI more in whom admitted in vascular surgery department. Moreover, our study found that any episode of intraoperative hypotension, longer operation duration and preoperative use of NSAIDs were identified as the most common risk factors for PO-AKI among the other studied risk factors. Finally, we observed that patients with PO-AKI had considerably higher rates of death, intensive care unit stays, and hospital duration of stay.

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