## 2017-2018 TRIALS ON IV FLUIDS a two-year highlight

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Title	Journal	PMID	Authors	DOI	Abstract
Haemoglobin concentration and volume of intravenous fluids in septic shock in the ARISE trial.	Crit Care	29724246	Maiden MJ; et al.	2018 May 3	RESULTS: Median (IQR) haemoglobin concentration at baseline was 133 (118-146) g/L and decreased to 115 (102-127) g/L within the first 6 h of resuscitation (P < 0.001), 110 (99-122) g/L after 24 h, and 109 (97-121) g/L after 72 h. At the corresponding time points, the cumulative volume of intravenous fluid administered was 1.3 (0.7-2.2) L, 2.9 (1.8-4.3) L and 4.6 (2.7-7.1) L. Haemoglobin concentration and its change from baseline had an independent but weak association with intravenous fluid volume at each time point (R[2) ≥ 20%, P < 0.001). After adjusting for covariates, each litter of intravenous fluid administed with a change in haemoglobin concentration of - 1.0 g/L (95% Cl -1.5 to -0.6, P < 0.001) at 24 h and - 1.3 g/L (-1.6 to -0.9, P < 0.001) at 72 h. CONCLUSIONS: Haemoglobin concentration decreases during resuscitation from septic shock, and has a significant but weak association with the volume of intravenous fluids administered.
Influence of Proportion of Normal Saline Administered in the Perioperative Period of Renal Transplantation on Kalemia Levels.	Transpla nt Proc	29579854	Gonzalez- Castro A; et al	2018 Mar	RESULTS: As the proportion of NS administered increased, K(+) levels at 24 hours were significantly increased (P = .026) (0.69 mEq/ L K(+) increase per 20% increase in NS ratio). Mean K(+) values at 24 hours (adjusted for total volume of fluids administered) ranged from 4.17 mEq/L (95% confidence interval [Ci] 3.7-4.56) in patients who did not receive NS to 4.85 mEq/L (95% Cl 4.56-5.15) in those administered exclusively NS. CONCLUSION: The risk of developing hyperkalemia in patients who receive a balanced solution with potassium in its formulation compared with NS in the perioperative period of renal transplantation is not increased, but the volume of NS administered is significantly associated with increases in K(+) levels at 24 hours.
Balanced Crystalloids versus Saline in Noncritically III Adults.	N Engl J Med	29485926	Self WH; et al	2018 Mar 1	RESULTS: A total of 13,347 patients were enrolled, with a median crystalloid volume administered in the emergency department of 1079 ml and 88.3% of the patients exclusively receiving the assigned crystalloid. The number of hospital-free days did not differ between the balanced-crystalloids and saline groups (median, 25 days in each group; adjusted odds ratio with balanced crystalloids, 0.98; 95% confidence interval [Ci], 0.92 to 1.04; P=0.41). Balanced crystalloids resulted in a lower incidence of major adverse kidney events within 30 days than saline (4.7% vs. 5.6%; adjusted odds ratio, 95% CI, 0.70 to 0.95; P=0.01). CONCLUSIONS: Among noncritically ill adults treated with intravenous fluids in the emergency department, there
Hydroxyethyl starch for volume expansion after subarachnoid haemorrhage and renal function: Results of a retrospective analysis.	PLoS One	29447255	Bercker S; et al.	2018	was no difference in hospital-free days between treatment with balanced crystalloids and treatment with saline.  RESULTS: The study groups had similar characteristics except for initial SAPS scores, incidence of vasospasm and ICU length of stay, Patients receiving HES fulfilled significantly more often SIRS (systemic inflammatory response syndrome) criteria. 24.6% (45/183) of the patients in the HES group had acute kidney injury (KDIGO 1-3) at any time during their ICU stay compared to 26.9% (25/93) in the crystalloid group = 0.679). Only lew patients needed renal replacement therapy with no significant difference between groups (Crystalloid group: 4.3%; HES group; 2.2%; p = 0.322). The incidence of vasospasm was increased in the HES group when compared to the crystalloid group (33.9% vs. 17.2%; p = 0.004). CONCLUSION: In the presented series of patients with non-traumatic SAH we found no significant association between HES therapy and the incidence of acute kidney injury.
What fluids are given during air ambulance treatment of patients with trauma in the UK, and what might this mean for the future? Results from the RESCUER observational cohort study.	BMJ Open	29362272	Naumann DN; et al.	2018 Jan 23	Treatment without HES did not worsen patient outcome.  RESULTS: Of 29 037 taskings, 729 (2.5%) were for patients with hypotensive trauma attended by a physician. Half were aged 21-50 years; 73.4% were male. A total of 537 out of 729 (73.7%) were given fluids. Five hundred and ten patients were given a single type of fluid; 27 received > 1 type. The most common fluid was 0.9% salline, given to 486/537 (90.5%) elents who received fluids, at a median volume of 750 (IQR 300-1500) mL. Three per cent of patients received PHBP. Estimated projections for patients eligible for PHBP at these 11 services and in the whole UK were 313 and 794 patients per year, respectively. CONCLUSIONS: One in 40 air ambulance taskings were manned by physicians to retrieve patients with hypotensive trauma. The most common fluid delivered was 0.9% saline. If evidence justifies universal provision of PHBP, approximately 800 patients/year would be eligible in the UK, based on our data combined with others published. Prospective investigations are required to confirm or adjust these estimations. (PHBP = Prehospital Blood Products)
Associations of fluid amount, type, and balance and acute kidney injury in patients undergoing major surgery.	Anaesth Intensiv e Care	29361260	Weinberg L; Li M; et al.	2018 Jan	Fluid administration has been reported to be associated with an increased risk of acute kidney injury (AKI). We assessed whether, after correction for fluid balance, amount and chloride content of fluids administered have an independent association with AKI. We performed an observational study in patients after major surgery assessing the independent association of AKI with volume, chloride content and fluid balance, after adjustment for Physiological and Operative Severity Score for entheration of Mortality and morbidity (POSSUM) score, age, elective versus emergency surgery, and duration of surgery. We studied 542 consecutive patients undergoing major surgery. Of these, 476 patients had renal function tested as part of routine clinical care and 53 patients (11.1%) developed postoperative AKI. After adjusting for key risk factors and for the confounding effect of fluid balance, greater fluid
Hydroxyethyl starch and kidney function: A retrospective study in patients undergoing therapeutic plasma exchange.	J Clin Apher	29083113	Radhakrish nan M; et al.	2018 Jun	administration and greater administration of chloride-rich fluid were associated with greater risk of AKI.  RESULTS: Of the 593 patients who received TPE during the study period, 104 patients fulfilled the inclusion criteria. Forty-five patients out of 104 received TPE in the intensive care unit. All patients received 2500 ml of HES during the study period. Blood urea and serum creatinine values, when compared to baseline, significantly decreased after 5 cycles of TPE (p = 0.004, p = 0.001, respectively). CONCLUSION: Blood urea and serum creatinine, used as markers of renal function, improved in patients requiring multiple doses of HES solutions during TPE. Further studies using novel renal biomarkers are required to examine whether HES induces any structural damage to kidneys.
Effect of an Early Resuscitation Protocol on In-hospital Mortality Among Adults With Sepsis and Hypotension: A Randomized Clinical Trial. (Africa)	JAMA	28973227	7 Andrews B; et al.	2017 Oct 3	Results: Among 212 patients randomized to receive either the sepsis protocol or usual care, 3 were ineligible and the remaining 209 completed the study and were included in the analysis (mean [SD] age, 36.7 [12.4] years; 117 men [56.0%]; 187 [89.5%] positive for the human immunodeficiency virus). The primary outcome of in-hospital mortality occurred in 51 of 10.6 patients (48.1%) in the sepsis protocol group compared with 34 of 103 patients (33.0%) in the usual care group (between-group difference, 15.1% [95% CI, 2.0%-28.3%]; relative risk, 1.46 [95% CI, 1.04-2.05]; P = .03). In the 6 hours after presentation to the emergency department, patients in the sepsis protocol group received a median of 3.5 L (interquartile range, 2.7-4.0 L) of intravenous fluid compared with 2.0 L (interquartile range, 1.0-2.5 L) in the usual care group (mean difference, 1.2 L [95% CI, 1.0-1.5 L); P < .001). Fifteen patients (14.2%) in the sepsis protocol group and 2 patients (19.%) in the usual care group received vasopressors (between-group difference, 12.3% [95% CI, 5.1%-19.4%]; P < .001). Conclusions and Relevance: Among adults with sepsis and hypotension, most of whom were positive for HIV, in a resource-limited setting, a protocol for early resuscitation with administration of intravenous fluids and vasopressors increased in-hospital mortality compared with usual care. Further studies are needed to understand the effects of administration of intravenous fluid boluses and vasopressors in patients with sepsis across different low- and middle-income clinical settings and patient populations.
Endothelial glycocalyx biomarkers increase in patients with infection during Emergency Department treatment.	J Crit Care	28822340	Smart L; et al	2017 Dec	PURPOSE: Endothelial glycocalyx (EG) shedding may promote organ failure in sepsis. This study describes temporal changes in EG biomarkers from Emergency Department (ED) arrival, and associations with clinical characteristics. CONCLUSIONS: In contrast to previous ICU studies, EG biomarkers increased during the first 24 hours of sepsis treatment and were associated with fluid volumes and organ failure. Further investigation is required to determine if interventions delivered in the ED contribute to EG shedding.
Relationship between Race and the Effect of Fluids on Long-term Mortality after Acute Respiratory Distress Syndrome. Secondary Analysis of the National Heart, Lung, and Blood Institute Fluid and Catheter Treatment Trial.	Ann Am Thorac Soc	28708421	Jolley SE et al.	2017 Sep	RESULTS: Non-Hispanic black (n = 217, 25%) or white identified subjects (n = 641, 75%) were included. There was a significant interaction between race and fluid treatment (P = 0.012). One-year mortality was lower for black subjects assigned to conservative fluids (38 vs. 54%; mean mortality difference, 16%; 95% confidence interval, 2-30%; P = 0.027 between conservative and liberal). Conversely, 1-year mortality for white subjects was 35% versus 30% for conservative versus liberal arms (mean mortality difference -4.8%; 95% confidence interval, -13% to 3%; P = 0.23). CONCLUSIONS: In our cohort, conservative fluid management may have improved 1-year mortality for non-Hispanic black patients with ARDS. However, we found no long-term benefit of conservative fluid management in white subjects.
Does fluid resuscitation with balanced solutions induce electrolyte and metabolic abnormalities? An in vitro assessment.	Kardiol Pol	28553873	Krzych Lu;Czempi k P	2017	BACKGROUND: Popular intravenous fluids in clinical use may have an impact on electrolyte concentration and metabolic balance and should be considered as powerful pharmacological agents. There is a growing body of evidence that fluid therapy should be more individualised and preferably based on balanced solutions. AIM: We sought to investigate the impact of three commonly used balanced fluids on electrolytes and metabolic equilibrium in an in vitro setting. CONCLUSIONS: Balanced intravenous solutions should be safe in terms of their impact on human plasma electrolyte and metabolic equilibrium when administered to replace up to 20% of blood volume. In metabolic acidosis, balanced succinylated gelatin should be used with caution. Therefore, arterial blood gas analysis should be performed in patients in whom significant amounts of fluid are administrated, preferably with assessment of CI-, Na+, lactate concentrations as well as pH, osmolality, and strong ion difference.
Time to Treatment and Mortality during Mandated Emergency Care for Sepsis.	N Engl J Med	28528569	Seymour CW; et al.	2017 Jun 8	RESULTS: Among 49,331 patients at 149 hospitals, 40,696 (82,5%) had the 3-hour bundle completed within 3 hours. The median time to completion of the 3-hour bundle was 1.30 hours (interquartile range, 0.55 to 2.35), the median time to the administration of antibiotics was 0.95 hours (interquartile range, 0.35 to 1.95), and the median time to completion of the fluid bolus was 2.56 hours (interquartile range, 1.33 to 4.20). Among patients who had the 3-hour bundle completed within 12 hours, a longer time to the completion of the bundle was associated with higher risk-adjusted in-hospital mortality (odds ratio, 1.04 per hour, 95% confidence interval (CI), 1.02 to 1.05, P-c.0.001), as was a longer time to the administration of antibiotics (odds ratio, 1.04 per hour; 95% CI, 1.03 to 1.05, P-c.0.001) but not a longer time to the completion of a bolus of intravenous fluids (odds ratio, 1.01 per hour; 95% CI, 0.99 to 1.02; P-c.2.01; CONCLUSIONS: More rapid completion of a 3-hour bundle of sepsis care and rapid administration of antibiotics, but not rapid completion of an initial bolus of intravenous fluids, were associated with lower risk-adjusted inhospital mortality.
Use of the Fluid Challenge in Critically III Adult Patients: A Systematic Review.	Anesth Analg	28514324	Messina A; et al.	2017 Nov	One hundred fifty-seven full-text manuscripts were extracted from 870 potentially relevant studies. The inclusion criteria were met by 71 studies including 3617 patients. Sixty-six studies were from a single center and 45 were prospective observational in format. The most common amount infused was 500 cc, used by 55 (77.5%) studies. The most common infused fluids were colloids (62.0%). In 43 (60.5%) studies, the FC was administered between 20 and 30 minutes. A positive response to fluid administration was defined as an increase >/=15% of cardiac index or cardiac output in 44 (62.6%) studies in the physiologic indices were utilized in a minority of studies (16.9%) and safety limits for interrupting the FC are adopted in 4 (6.6%) studies only. This systematic review indicates that the FC most commonly consists in infusing 500 mL of crystalloids or colloids in 20-30 minutes, and considered an increase in cardiac index >/=15% as a positive response. However, definite standards for FC administration and evaluation remain undefined.
Patterns of intravenous fluid resuscitation use in adult intensive care patients between 2007 and 2014: An international crosssectional study.	PLoS One	28498856	Hammond NE; et al.	2017	FINDINGS: In 2014, a total of 426 ICUs in 27 countries participated. Over the 24 hour study day, 1456/6707 (21.7%) patients received resuscitation fluid during 2716 resuscitation episodes. Crystalloids were administered to 1227/1456 (84.3%) patients during 2208/2716 (81.3%) episodes and colloids to 594/1456 (27.1%) patients during 558/1276 (81.3%) episodes and multiwariate analyses, practice significantly varied between geographical regions. Additionally, patients with a traumatic brain injury were less likely to receive colloid when compared to patients with no trauma (adjusted OR 0.24; 95% CI 0.1 to 0.62; p = 0.003). Patients in the ICU for one or more days where more likely to receive colloid compared to patients in the ICU to on their admission date (adjusted OR 0.175; 95% CI 0.1 to 0.62; p = 0.003). Patients in fluid resuscitation, 84 ICUs in 17 countries contributed data. In 2007, 527/1663 (31.7%) patients received fluid resuscitation during 1167 episodes compared to 491/1763 (27.9%) patients during 960 episodes in 2014. The use of crystalloids increased from 498/1167 (42.7%) in 2007 to 694/960 (72.3%) in 2014 (odds ratio (OR) 3.75, 95% confidence interval (Cl 2.95 to 4.77; p = <.0001), primarily due to a significant increase in the use of buffered salt solutions. The use of colloids decreased from 724/1167 (62.0%) in 2007 to 297/960 (30.9%) in 2014 (OR 0.29, 95% CI 0.19 to 0.43; p = <.001), primarily due to a decrease in the use of buffered salt solutions. The type of fluid administered for fluid resuscitation. Overall, there is a preferential use of calbumin. CONCLUSIONS: Clinical practices of intravenous fluid resuscitation have changed between 2007 and 2014. Geographical location remains a strong predictor of the type of fluid administered for fluid resuscitation. Overall, there is a preferential use of calbumin. CoNCLUSIONS:
Comparison of the incidences of hyponatremia in adult postoperative critically ill patients receiving intravenous maintenance fluids with 140 mmol/L or 35 mmol/L of sodium: retrospective before/after observational study.	J Anesth	28455602	Okada M; et al.	2017 Oct	RESULTS: We included 179 patients (Na35: 87 patients, Na140: 92 patients) in the current study. The mean volume of fluid received from ICU admission to POD 2 was not significantly different between the two groups (3291 vs 3337 mL, p = 0.84). The incidence of postoperative hyponatremia was 16.3% (15/82) in the Na140 cohort, which was significantly lower than that of 52.9% (46/87) in the Na35 group (odds ratio = 0.17, 95% confidence interval 0.09-0.35, p < 0.001]. The incidences of hypornatremia, defined as serum sodium concentration >145 mmol/L, were not significantly different between the two groups. CONCLUSION: In this study, the use of intravenous maintenance fluid with 35 mmol/L of sodium was significantly associated with an increased risk of hyponatremia compared to that with 140 mmol/L of sodium in adult postoperative critically ill patients.
Early, Goal-Directed Therapy for Septic Shock - A Patient-Level Meta-Analysis.	N Engl J Med	28320242	Rowan KM; et al	2017 Jun 8	RESULTS: We studied 3723 patients at 138 hospitals in seven countries. Mortality at 90 days was similar for EGDT (462 of 1852 patients [24.9%]) and usual care (475 of 1871 patients [25.4%]); the adjusted odds ratio was 0.97 (65% confidence interval, 0.82 to 1.14; P=0.68). EGDT was associated with greater mean (+/-SD) use of intensive care (5.3+/-7.1 vs. 4.9+/-7.0 days, P=0.04) and cardiovascular support (1.9+/-3.7 vs. 1.6+/-2.9 days, P=0.01) than was usual care; other outcomes did not differ significantly, although average costs were higher with EGDT. Subgroup analyses showed no benefit from EGDT for patients with worse shock (higher serum lactate level, combined hypotension and hyperfactatemia, or higher predicted risk of death) or for hospitals with a lower propensity to use vasopressors or fluids during usual resuscitation. CONCLUSIONS: In this meta-analysis of individual patient data, EGDT did not result in better outcomes than usual care and was associated with higher hospitalization costs across a broad range of patient and hospital characteristics.
Acute kidney injury in pancreatic surgery; association with urine output and intraoperative fluid administration.	Am J Surg	28223046	Goren O; et al.	2017 Aug	BACKGROUND: Acute kidney injury (AKI) is a devastating postoperative complication. Intraoperative urine output is assumed to reflect patient's intravascular volume and kidney function. We thus evaluated the incidence of postoperative AKI and its association with intraoperative urine output and the volume of fluid administered. METHODS: A retrospective study on 158 consecutive patients admitted to Tel Aviv Medical Center for pancreatic surgery. RESULTS: The incidence of AKI in patients undergoing pancreatic surgery was 9.8%. Oliguria was not a predictor of AKI. There was no association between the amount of fluids administered and AKI. Pulmonary disease is an independent predictor of AKI. AKI is an independent predictor of CONCLUSIONS: AKI is common in patients undergoing pancreas surgeries and is associated with high mortality. Neither urine output, nor the volume of fluids administered correlate with postoperative AKI. Low diuresis is therefore not a sole marker for fluid administration.
Fluid balance and chloride load in the first 24h of ICU admission and its relation with renal replacement therapies through a multicentre, retrospective, case-control study paired by APACHE-II.	Rev Esp Anestesi ol Reanim	28196670	Gonzalez- Castro A; etc	2017 May	RESULTS: We analysed the variables of 430 patients: 215 cases and 215 controls. An increase of 10% of the possibility of developing AKI-RRT per 500ml of positive water balance was evident (OR: 1.09 [95% CI: 1.05 to 1.14]; Pc.001). The study of mean values of chloride load administered did not show differences between the group of cases and controls (299.354/-254.91 vs. 301.674/-234.61; Pe.92). CONCLUSIONS: The water balance in the first 24h of (CI admission relates to the development of IRA-TRR, regardless of chloraemia. (Acute kidney injury renal replacement therapy = (AKI-RRT))
Fluids and sepsis: changing the paradigm of fluid therapy: a case report.	J Med Case Rep	28159011	Hariyanto H; et al.	2017 Feb 4	CASE PRESENTATION: An 86-year-old previously healthy Sundanese man was admitted to the intensive care unit at our institution with septic shock, acute kidney injury, and respiratory distress. Standard care was implemented during his initial care in the high-care unit; nevertheless, his condition worsened, and he was transferred to the intensive care unit. We describe the timing of fluid administration and elaborate on the amount of fluids needed using a conservative fluid regimen in a continuum or fresuscitated sepsis. CONCUSIONS: Because fluid depletion in septic shock is caused by capillary leak and pathologic vasoplegia, continuation of fluid administration will drive intravascular fluid into the interstitial space, thereby producing marked tissue edema and disrupting vital oxygenation. Thus, fluids have the power to heal or kill. Therefore, management of patients with

	Patterns and Outcomes Associated With Timeliness of Initial Crystalloid Resuscitation in a Prospective Sepsis and Septic Shock Cohort.  Study protocol for the Balanced	Crit Care Med	28671898 28651514	Leisman DE; et al.	2017 Oct	MEASUREMENTS AND MAIN RESULTS: We identified 11,182 patients. Crystalloid initiation was faster for emergency department patients (beta, -141 min; Cl, -159 to -125; p < 0.001), baseline hypotension (beta, -39 min; Cl, -48 to -32; p < 0.001), fever, urinary or skin/soft-tissue source of infection. Initiation was slower with heart failure (beta, 20 min; Cl, 1-25; p < 0.001), and renaf failure (beta, 16 min; Cl, 10-22; p < 0.001). Five thousand three hundred thirty-six patients (48%) had crystalloid initiated in 30 minutes or lesser versus 2,388 (21%) in 31-120 minutes, and 3,458 (31%) in more than 120 minutes receiving fluids within 30 minutes had lowest moretallity (949 [17.8%)) versus 31-120 minutes (446 [18.7%)] and more than 120 minutes (466 [24.5%)].  Compared with more than 120 minutes, the adjusted odds ratio for mortality was 0.76 (Cl, 0.64-0.90; p = 0.002) for 30 minutes or lesser and 0.76 (Cl, 0.62-0.92; p = 0.004) for 31-120 minutes. When assessed continuously, mortality odds increased by 1.09 with each hour to initiation (Cl, 1.03-1.16; p = 0.002). We observed similar patterns for mechanical ventilation, ICU utilization, and length of stay. We did not observe significant interaction for mortality risk between initiation time and baseline heart failure, hypotension, acute kidney injury, altered gas exchange, or emergency department (vs inpatient) presentation. CONCLUSIONS: Crystalloid was initiated significantly later with comorbid heart failure and renal failure, with absence of fever or hypotension, and in impatient-presenting sepsis. Earlier crystalloid initiation was associated with decreased mortality. Comorbidities and severity did not modify this effect.  A total of 11 000 patients will be recruited from at least 100 Brazilian intensive care units. Patients will be randomised to receive
	Solution versus Saline in Intensive Care Study (BaSICS): a factorial randomised trial.	Care Resusc		FG; et al.	Jun	Plasma-Lyte 148 or saline, and to rapid infusion (999 mL/h) or slow infusion (333 mL/h). Study fluids will be used for resuscitation episodes (at rapid or slow infusion rates), dilution of compatible medications and maintenance solutions. Patients, health care providers and investigators will be blinded to the solutions being tested. The rate of bolus infusion will not be blinded. OUTCOMES: The primary outcome is 90-day all-cause mortality. Secondary outcomes are: incidence of renal failure requiring renal replacement therapy within 90 days, incidence of acute kidney injury (Kidney Disease: Improving Global Outcomes stages 2 and 3), incidence of non-renal organ dysfunction assessed by Sepsis-related Organ Failure Assessment score at Days 3 and 7, and number of mechanical ventilationfree days within the first 28 days after randomisation. RESULTS AND CONCLUSIONS: The BaSICS trial will provide robust evidence on whether a balanced crystalloid, compared with saline, improves important patient outcomes in critically ill patients. BaSICS will also provide relevant information on whether bolus infusion rate affects outcomes in this population.
	Drivers of choice of resuscitation fluid in the intensive care unit: a discrete choice experiment.	Crit Care Resusc	28651509	Taylor CB; et al	2017 Jun	RESULTS: For doctors, safety concerns, patient type and fluid type were collectively responsible for almost three-quarters of decision-making utility (71%). The volume of intravenous fluid administered was the only clinical parameter not reaching statistical significance as a driver of fluid choice (P = 0.06). For nurses, decision making was influenced a greater extent by the same three attributes (90%), although other unmeasured attributes may have been driving choice. CONCLUSIONS: Doctors and nurses rely on different information when choosing resuscitation fluids, although both cohorts are heavily influenced by safety concerns, patient type and fluid type. This information can be used to modify prescribing behaviour.
	Renal effects of an emergency department chloride-restrictive intravenous fluid strategy in patients admitted to hospital for more than 48 hours.	Emerg Med Australa s	28597505	Yunos NM; et al.	2017 Dec	OBJECTIVE: Patients commonly receive i.v. fluids in the ED. It is still unclear whether the choice of i.v. fluids in this setting influences renal or patient outcomes. RESULTS: Stage 3 of KDIGO-defined AKI decreased from 54 (1.1%; 95% confidence interval [CI] 0.8-1.4) to 30 (0.6%; 95% CI 0.4-0.8) (P = 0.006). The rate of renal replacement therapy did not change, from 13 (0.3%; 95% CI 0.2-0.4) to 8 (0.2%; 95% CI 0.1-0.3) (P = 0.25). After adjustment for relevant covariates, liberal chloride therapy remained associated with a greater risk of KDIGO stage 3 (nazard ratio 1.82; 95% CI 1.13-2.95; P = 0.01). On sensitivity assessment after removing repeat admissions, KDIGO stage 3 remained significantly lower in the intervention period compared with the control period (P = 0.01). CONCLUSION: In a before-and-after trial, a chloride-restrictive strategy in an ED was associated with a significant decrease in the incidence of stage 3 of KDIGO-defined AKI.
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SECOND A VINCEN	Fluid overload is an independent risk factor for acute kidney injury in critically III patients: results of a cohort study.	BMC Nephrol	28143505	Salahuddin N; et al	2017 Feb 1	RESULTS: Three hundred thirty nine patients were included; AKI developed in 141 (41.6%) patients; RISK in 27 (8%) patients; INJURY in 25 (7%); FAILURE in 89 (26%) by the RIFLE criteria. Fluid balance was significantly higher in patients with AKI; 1755 +/-2189 v/s 924 +/- 1846 ml, p < 0.001 on ICU day 1. On multivariate regression analysis, a net fluid balance in first 24 h of ICU admission, OR 1.02 (95% CI 1.01,1.03 p = 0.003), percentage of fluid accumulation adjusted for body weight OR1.009 (95% CI 1.01,1.01,01,017, p = 0.02), fluid balance in first 24 h of ICU admission with serum creatinine adjusted for fluid balance, OR 1.024 (95% CI 1.012,1,035, p = 0.005), Age, OR 1.02 95% CI 1.01,1.03, p < 0.001, CHF, OR 3.1 (95% CI 1.16,8.32, p = 0.023), vasopressor requirement on ICU day one, OR 1.9 (95% CI 1.13,3.19, p = 0.014) and Colistin OR 2.3 (95% CI 1.3, 4.02, p < 0.001) were significant predictors of AKI. There was no significant association between fluid type; Chloride-liberal, Chloride-restrictive, and AKI. CONCLUSIONS: Fluid overload is an independent risk factor for AKI.
N. PAR. CHANGE SERVICE	Perioperative Hemodynamic Instability and Fluid Overload are Associated with Increasing Acute Kidney Injury Severity and Worse Outcome after Cardiac Surgery.	Blood Purif	28142133	Haase- Fielitz A; et al	2017	RESULTS: Patients with worsening RIFLE stage, were significantly older, had lower estimated glomerular filtration rate and higher body mass index, more peripheral vascular and chronic obstructive pulmonary disease, atrial fibrillation, and prolonged duration of cardiopulmonary bypass (all p < 0.01). Patients with more severe AKI stage stayed longer in the intensive care and hospital, had higher in-hospital mortality, and requirement for RRT (all p < 0.001). Also, with worsening RIFLE stage, patients had lower intraoperative mean arterial pressure (MAP); p = 0.047, despite higher doses of norepinephrine (p < 0.001). The intraoperative MAP showed the best discriminatory ability (AUC-ROC: >0.8) for and was independently associated with RRT and in-hospital mortality. Moreover, with increasing AKI severity, patients received significantly more fluid influsion, and required higher dose of furosemide; nonetheless, they had increased postoperative fluid balance. CONCLUSIONS: In this cohort, reduced MAP and increased fluid balance were independently associated with increased mortality and need for RRT after cardiac surgery.
MANUAL WORLD STATES	Fluid administration in severe sepsis and septic shock, patterns and outcomes: an analysis of a large national database.	Intensiv e Care Med	28130687	Marik PE; et al	2017 May	RESULTS: Day 1 fluid administration averaged 4.4 L being lowest in the group with no mechanical ventilation and no shock (3.6 L) and highest (5.4 L) in the group receiving mechanical ventilation and in shock. The administration of day 1 fluids was remarkably consistent on the basis of hospital size, teaching status, rural/urban location, and region of the country. The hospital mortality in the entire cohort was 25.8%, with a mean ICU and hospital length of stay of 5.1 and 9.1 days, respectively. In the entire cohort, low volume resuscitation (1-4.99 L) was associated with a small but significant reduction in mortality of -0.7% per lifter (95% CI -1.0%, -0.4%; p = 0.02). However, in patients receiving high volume resuscitation (6 to >/=9 L), the mortality increased by 2.3% (95% CI -2.0, 2.5%; p = 0.0003) for each additional litre above 5 L. Total hospital cost increased by \$999 for each litre of fluid above 5 L (adjusted R (2) = 92.7%, p = 0.005). CONCLUSION: The mean amount of fluid administered to patients with severe sepsis and septic shock in the USA during the first ICU day is less than that recommended by the Surviving Sepsis Campaign guidelines. The administration of more than 5 L of fluid during the first ICU day is associated with a significantly increased risk of death and significantly higher hospital costs.
The second second	Disparities in hemodynamic resuscitation of the obese critically ill septic shock patient.	J Crit Care	27969574	Adams C; et al.	2017 Feb	RESULTS: With the exception of weight and sex, baseline characteristics were similar among groups. Early resuscitative fluids were given at a lower weight based, but not total volume dose in the obese group (nonobese, 3.4 8 mL/kg vs obese, 2.4 mL/kg; P <
	A comparison of balanced and unbalanced crystalloid solutions in surgery patient outcomes.	Anaesth Crit Care Pain Med	27856390	Kuca T; et al	2017 Dec	RESULTS: Overall, 796 vascular surgery patients were included in the analysis. There were 425 patients who received balanced crystalloids, 158 patients who received NS, and 213 patients received both balanced crystalloids and NS. Groups were similar in age (P=0.06), but varied in gender (P<0.001) and overall health (ASA)-2; P<0.027). The most common adverse event was ventilator requirement (NS: 27.9%, balanced: 7.5%, both: 38.0%; P<0.001). Mortality was lowest in the group that received balanced fluids (NS: 12.0%, balanced: 5.9%, both: 10.8%; P=0.018). Patients who were administered NS or both fluids were more likely to reach the composite endpoint than patients receiving balanced crystalloid alone. CONCLUSION: The administration of an unbalanced crystalloid solution was associated with poor patient outcomes in our study population.
A		J	27805990	Joseph B;	2017	RESULTS: Patient demographics and ISS remained the same throughout the three phases. There was a significant reduction in the
	Improving mortality in trauma laparotomy through the evolution of damage control resuscitation: Analysis of 1,030 consecutive trauma laparotomies.	Trauma Acute Care Surg	27603990	et al.	Feb	volume of crystalloid (p = 0.001) and a concomitant increase in the blood product resuscitation (p = 0.04) in the post-DCR phase compared to the pre-DCR and transient DCR phases. Volume of crystalloid resuscitation was an independent predictor of mortality in the pre-DCR QR [95% CI]: 1.07 [1,03-1.1], p = 0.01) and transient (OR [95% CI]: 1.05 [1,01-1.1], p = 0.01) phases; however, it was not associated with mortality in the post-DCR phase (OR [95% CI]: 1.01 [0.96-1.09], p = 0.1). Coagulopathy (p = 0.01) and acidosis (p = 0.02) were independently associated with mortality in all three phases. CONCLUSION: The implementation of DCR was associated with improved outcome in patients undergoing TL. There was a decrease in the use of damage control laparotomy, with a decrease in the use of crystalloid and an increase in the use of blood products. LEVEL OF EVIDENCE: Prognostic study, level III.
	Hemodynamic Effect of Different Doses of Fluids for a Fluid Challenge: A Quasi-Randomized Controlled Study.	Crit Care Med	27655325	Aya HD;Rhode s A;Chis Ster I;Fletcher N;Grounds RM;Cecco ni	2017 Feb	MAIN RESULTS: Mean systemic filling pressure measured using the transient stop-flow arm arterial-venous equilibrium pressure, arterial and central venous pressure, cardiac output (LIDCOplus; LIDCO, Cambridge, United Kingdom), and heart rate. The groups were well matched with respect to demographic and baseline physiologic variables. The proportion of responders increased from 20% in the group of 1 mL/kg to 65% in the group of 4 mL/kg (p = 0.04). The predicted minimal volume required for an fluid challenge was between 321 and 509 mL. Only 4 mL/kg increases transient stop-flow arm arterial-venous equilibrium pressure beyond the limits of precision and was significantly associated with a positive response (odds ratio, 7.73; 95% CI, 1.78-31.04). CONCLUSION: The doses of fluids used for an fluid challenge modify the proportions of responders in postoperative patients. A dose of 4 mL/kg increases transient stop-flow arm arterial-venous equilibrium pressure and reliably detects responders and nonresponders.
	Chloride Content of Fluids Used for Large-Volume Resuscitation Is Associated With Reduced Survival.	Crit Care Med	27635770	Sen A;Keener CM;Silean u FE;Foldes E;Clermont G;Murugan R;Kellum J	2017 Feb	MAIN RESULTS: Among 4,710 patients receiving large-volume fluid resuscitation, hyperchloremic acidosis was documented in 523 (11%). Crude rates of hyperchloremic acidosis, acute kidney injury, and hospital mortality all increased significantly as chloride load increased (p < 0.001). However, chloride load was no longer associated with hyperchloremic acidosis or acute kidney injury after controlling for total fluids, age, and baseline severity. Conversely, each 100 mEq increase in chloride load was associated with a 5.5% increase in the hazard of death even after controlling for total fluid volume, age, and severity (p = 0.0015) over 1 year. CONCLUSIONS: Chloride load is associated with significant adverse effects on survival out to 1 year even after controlling for total fluid load, age, and baseline severity of illness. However, the relationship between chloride load and development of hyperchloremic acidosis or acute kidney injury is less clear, and further research is needed to elucidate the mechanisms underlying the adverse effects of chloride load on survival.
	Hyperchloremic acidosis is associated with acute kidney injury after abdominal surgery.	Nephrol ogy (Carlton)	27312130	Toyonaga Y;Kikura	2017 Sep	RESULTS: Of 206 patients (144 male, 69.9%) included in the study, 42 (20.4%) had postoperative AKI (AKI group) and 164 (79.6%) did not (non-AKI group). Base excess-chloride (BE-Cl) and strong ion difference (SID, approximated as Na-Cl) decreased, and the chloride level on postoperative day 1 increased compared with preoperative values in both groups (P < 0.05). In the AKI group, BE-Cl and SID were lower, and chloride was higher than in the non-AKI group (P < 0.05). The intraoperative load of chloride ions in fluids increased the risk of postoperative AKI (P < 0.01). In multivariate logistic regression analysis, postoperative BE-Cl < -7 mEq/L (i.e. SID <31 mEq/L) was an independent risk factor for AKI (odds ratio; 2.8, 95% Cl; 1.2-6.4, P = 0.01). In the AKI group, stays in the intensive care unit and in hospital were longer than those in the non-AKI group (P < 0.05). CONCLUSION: Hyperchloremic acidosis is associated with postoperative AKI, and this may be attenuated by reducing the intraoperative chloride load.  BESULTS: Perioperative and postoperative univariate predictors of MACCE at 30-day follows up were: total amount of fluids (during
1	Excessive intravenous fluid therapy in head and neck cancer surgery.	Head Neck	27299857	Haapio E;Kinnunen I;Airaksine n JK;Irjala H;Kiviniemi	2017 Jan	RESULTS: Perioperative and postoperative univariate predictors of MACCE at 30-day follow-up were: total amount of fluids (during 24 hours) over 4000 mL, any red blood cell (RBC) infusion, treatment in the intensive care unit (ICU), tracheostomy, and microvascular reconstruction surgery. Median time from operation to MACCE was 3 days. Patients receiving >4000 mL of fluids had MACCE more often compared with those receiving <4000 mL (10.8% vs 2.4%; p < .001, respectively). Moreover, every RBC unit transfused or every liter of fluid administered over 4000 mL/24 hi increased the risk of MACCE MSy per unit/liter, respectively. CONCLUSION: Patients with head and neck cancer receiving excessive intravenous fluid administration perioperatively and postoperatively are at high risk for cardiac complications, especially heart failure.



