Table S1: Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system to assess evidence[a]

Quality of evidence		
High Quality	⊕ ⊕ ⊕ ⊕	A
Moderate Quality	⊕ ⊕ ⊕ O	B
Low Quality	⊕ ⊕ O O	C
Very Low Quality	⊕ O O O	D
Strength of recommendation		
Strong recommendation for using an intervention	⇑⇑	1
Weak recommendation for using an intervention	⇑ ?	2
Weak recommendation against using an intervention	⇓ ?	3
Strong recommendation against using an intervention	⇓⇓	4

[a]Guyatt GH, Oxman AD, Kunz R, et al. Going from evidence to recommendations. *BMJ*. 2008;336(7652):1049–1051.

Table S2 A and B: Evidence about amount of fluid administration and monitoring of volume status in kidney transplantation

Table S2A: Amount of fluid administration in kidney transplantation

Study	Type	Subjects	Intervention	Endpoint	n	Results	Level of evidence
Carlier et al (1983)[1]	Retrospective, observational	Cadaveric kidney transplant recipients	1. (22): mean PAP $\leq$ 20 mm Hg, diastolic PAP $\leq$ 15 mm Hg 2.(98) patients: mean PAP > 20 mm Hg, diastolic PAP > 15 mm Hg.	Acute tubular necrosis (ATN)	120	ATN 36% in group 1 vs 6% in group 2	3B
Thomsen et al (1987)[2]	Retrospective	Kidney transplants, unstated	1. (31), CVP > 5 mmHg 2. (30), CVP not measured	Onset postop graft function	61	More frequent onset graft function in CVP group (62 vs 30%)	3C
Toth et al (1998)[3]	Prospective, observational	Cadaveric kidney transplant recipients	Observational	Good, delayed, no postop graft function	120	Higher MAP (103 vs 90 vs 81), better periop fluid balance associated good function	2B
Bacchi et al (2010)[4]	Retrospective, observational	Cadaveric KT recipients	58 patients with delayed graft function (DGF), 97 patients without DGF	Delayed Graft Function	155	Strongest correlates of DGF: - CVP at awakening $\leq$ 8 mm Hg (odds ratio [OR] 3.53; 95% confidence interval [CI], 1.63-7.63) - Fluid input during surgery $\leq$ 2.250 mL (OR 2.12; 95% CI, 1.00-4.51) - Recipient age $\geq$50 years (OR = 2.72; 95% CI, 1.11-6.68)	3B
Snoeijs et al (2007)[5]	Retrospective, observational	Cadaveric KT recipients	CVP < 6 mm Hg Matched comparison of grafts from the same donor	Delayed Graft Function, Primary nonfunction	177 56 pairs from same donor	CVP < 6 mmHg independent risk factor for PNF (adjusted OR 3.1 (95% CI: 1.4– 7.1), p = 0.007) - Paired comparison: lower CVP - 29% PNF compared to 11% PNF with higher CVP (p = 0.09)	3B

Campos et al 2012[6]	Retrospective, observational	Not specified	CVP < 11 mm Hg (716) vs CVP > 11 mm Hg (303)	Chronic dysfunction Banff criteria	1966 recipients (over 29 years) 1019 included in CVP comparison	Twofold greater risk chronic dysfunction in group with higher CVP (P < 0.001)	2B
Othman et al (2010)[7]	RCT	Living donor KT	A. Saline 0.9% at 10-12 mL/kg/h from start to unclamping of renal vessels B. Saline 0.9% to maintain CVP 5 until clamping of donor vessels, then CVP goal 15 mmHg until end vascular anastomosis	Early renal function: FENa% Kidney turgidity score at end vascular anastomosis (blinded surgeon)	40	Similar total fluid both groups (3 L) but higher incidence good kidney turgidity, better FENa% immediately post recovery, better serum creatinine day 1 in group B	1B

Table S2 b: Evidence about monitoring of volume status in kidney transplantation

Aulakh et al (2015)[8]	Retrospective case-control	Live-related donors.	Noninterventional groups based: CVP > 12 mmHg MAP > 100 mmHg at declamping	Effect intraoperative CVP and MAP on early graft function and biochemical outcome	100	CVP 12 mmHg and MAP >95 mmHg with good perioperative fluid hydration associated good early graft function	2B
Ferris et al (2003)[9]	Retrospective	Cadaveric (65) and live related (12) kidney transplants	Dynamics of perioperative CVP Intraoperative CVP maintained 10-12 mmHg	Acute tubular necrosis	77	No effect absolute value or postoperative decrease in CVP on ATN	3C
Adelmann (2018)[10]	Retrospective	Cadaveric kidney transplants	Noninterventional, nonprotocolized CVP use	Graft function	84 (29%) with CVP of 290 cohort	No difference graft outcome with CVP use	3B
Gingell-Littlejohn (2013)[11]	Retrospective	Cadaveric (97) and live related (52) kidney transplants	Dynamics of perio and postoperative MAP and CVP	Graft function	149	CVP < 8 not associated graft outcome MAP < 70 associated poor graft outcome (p = 0.005)	3B
Chin et al (2014)[12]	Retrospective case-control	Consecutive kidney transplant	Non-interventional	SVV and CVP in guiding intravascular volume Graft perfusion and long-term graft function	635 (887 total, 252 excluded for incomplete records)	SVV may replace CVP and may improve graft perfusion at critical time points during kidney transplant.	2B
Toyoda et al (2015)[13]	Prospective, observational	Living related renal transplantation	Non-interventional	SVV CVP and PADP as estimate of right and left ventricular preload	31	SVV can correctly predict preload status compared to pressure-based indices	2B
Srivastava et al (2015)[14]	Prospective, observational	Living donor kidney transplant	Doppler guided versus CVP guided fluid therapy	Fluid volume (ml/kg/hr) Graft outcome Postoperative complications	110	Doppler guided fluid similar result graft function as CVP-guided, 40% < fluids Reduced postop complications related fluid overload	2B

Collange et al (2016)[15]	Prospective, observational	Deceased donor kidney transplant	Noninterventional	Relationship between intraoperative Pleth variability index and CVP on DGF	40	PVI values >9% associated with occurrence DGF	2B

Table S3. Albumin vs Crystalloid in kidney transplantation

Study	Type	Subjects	Intervention	Endpoints	n	Results	Level of evidence
Dawidson et al (1992)[16]	Retrospective, historical controls	Cadaveric KT	High (1.2-1.6 g/kg) vs low (0-0.4 g/kg) albumin administration	Delayed function (need hemodialysis during first week)	438	- DGF: 34% low-dose, 12 % high dose albumin - 1 year graft survival, 59% high-dose, 78% low-dose ($p < 0.002$) - No difference 3 month mortality	2B
Abdallah et al (2014)[17]	RCT	KT (donor type not specified)	Intraoperative: 20% albumin vs 0.9% saline to keep CVP 10 - 15 mmHg	Early and late graft function Volume infused Time of onset diuresis Total intraoperative urine output	44	No difference total fluid administered, time onset diuresis, postoperative serum creatinine days 1, 3, 5	3A
Shah et al (2014)[18]	RCT	Living donor renal transplantation	20% human albumin vs 0.9% saline to keep CVP 12-15 mmHg	Posttransplant serum creatinine, urine output	80	No difference total volume fluid, postoperative serum creatinine, urine output	3A
Limnell et al (2018)[19]	Retrospective	Donors of subsequent kidney graft recipients	Crystalloid and colloid volumes (gelatin, albumin, HES) administered to donors	DGF in recipients	100 donors, 181 recipients (data for 143)	Greater DGF (30% vs 11%, $p = 0.005$) when crystalloid alone vs colloid (significant for gelatin, not albumin)	2B

Table 4: Evidence related to the use of hydroxyl ethyl starches

Table S4 a: Evidence that relates to the use of hydroxyl ethyl starch (HES) solutions in ICU and other populations

Study	**Type**	**Subjects**	**Intervention**	**Endpoints**	**n**	**Results**	**Level of evidence**
Brunkhorst et al 2008[20]	RCT	Severe sepsis	10% HES (200/0.5) to Lactated Ringer (and conventional vs intense insulin therapy in a 2x2 factorial design)	28-day mortality Acute renal failure Renal replacement therapy (RRT)	600	HES: More renal failure (30.9% vs 21.7%, P=0.04) More likely renal replacement therapy (RRT) (25.9% vs 17.3%, P=0.03)	1B
Myburgh et al 2012[21]	RCT	ICU patients	6% HES (130/0.4) vs 0.9% saline for all fluid resuscitation until ICU discharge, death, or 90 days after randomization.	Mortality Acute Kidney Injury (AKI) Renal replacement therapy (RRT)	7,000	No difference in mortality but increased risk for AKI (38.0% for HES vs 34.6% for control, (P=0.005) RRT (7% HES vs 5.8$ control, P=0.04)	1B
Perner et al 2012[22]	Sever sepsis		6% HES 130/0.42 (Tetraspan) or Ringer's acetate up to 33 ml/kg/day	90-day mortality Renal Replacement therapy (RRT) days	798	Mortality: HES: 51% vs 43% Ringer acetate, p=0.03 RRT: HES 22% vs. Ringers acetate: 22%, p=0.04	1B
Davidson 2006[23]	Meta-analysis	23 RCTs	HES vs gelarin vs dextran			Increased renal failure	2A

Table S4-b. Evidence that relates to the use of hydroxyl ethyl starch (HES) solutions in kidney transplant donors

Study	**Type**	**Subjects**	**Intervention**	**Endpoints**	**n**	**Results**	**Level of Evidence**
Cittanova et al 1996[24]	RCT	Cadaveric donors after death by neurological criteria	HES 200/0.62 vs gelatin up to 33 mL/kg	Posttransplant serum creatinine Renal replacement therapy	47 transplants (15 donors for 27 recipients and in the gelatin group 12 donors for 20 recipients	HES: higher serum creatinine (p=0.009) More frequent need for RRT (33 vs 5%, p=0.029). Randomly performed biopsy demonstrated tubular (proximal and distal) osmotic-nephrosis-like lesions in all patients in HES group and none in control group. Lesions were found up to 2 years after KT.	2B
Patel et al 2015[25]	Prospective, observational study	Cadaveric donors after death by neurological criteria from a single OPO.	HES was used in 42% of donors (1217 ± 528 mL)	Delayed graft function	529 donors for 986	After propensity adjustment , HES administration was identified as independent predictor factor for DGF (OR 1.41).	2B

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