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Supplementary material

Supplementary Table 1. Search criteria	
Embase.com	('blood group ABO incompatibility'/de OR 'blood group incompatibility'/de OR (((abo OR ab0 OR 'blood group' OR 'type A' OR 'type A2' OR 'type A1' OR 'type B' OR 'type AB' OR 'type O') NEAR/6 (incompatib* OR mismatch* OR barrier* OR antibod*))):ab,ti) AND ('kidney transplantation'/exp OR 'renal graft dysfunction'/exp OR 'kidney donor'/de OR (transplantation/de AND kidney/exp) OR ((kidney* OR renal*) NEAR/3 (transplant* OR homotransplant* OR autotransplant* OR graft* OR allograft* OR donor* OR donat* OR recipient*)):ab,ti)
Medline (OvidSP)	("Blood Group Incompatibility"/ OR (((abo OR ab0 OR "blood group" OR "type A" OR "type A2" OR "type A1" OR "type B" OR "type AB" OR "type O") ADJ6 (incompatib* OR mismatch* OR barrier* OR antibod*))).ab,ti.) AND ("Kidney Transplantation"/ OR kidney/tr OR ((kidney* OR renal*) ADJ3 (transplant* OR homotransplant* OR autotransplant* OR graft* OR allograft* OR donor* OR donat* OR recipient*)).ab,ti.)
Cochrane	((((abo OR ab0 OR 'blood group' OR 'type A' OR 'type A2' OR 'type A1' OR 'type B' OR 'type AB' OR 'type O') NEAR/6 (incompatib* OR mismatch* OR barrier* OR antibod*))):ab,ti) AND (((kidney* OR renal*) NEAR/3 (transplant* OR homotransplant* OR autotransplant* OR graft* OR allograft* OR donor* OR donat* OR recipient*)):ab,ti)
Web-of-science	TS=(((((abo OR ab0 OR "blood group" OR "type A" OR "type A2" OR "type A1" OR "type B" OR "type AB" OR "type O") NEAR/6 (incompatib* OR mismatch* OR barrier* OR antibod*)))) AND (((kidney* OR renal*) NEAR/3 (transplant* OR homotransplant* OR autotransplant* OR graft* OR allograft* OR donor* OR donat* OR recipient*))))
Google scholar	"ABO|ab0 incompatibility|incompatible "kidney|renal transplantation|graft|allograft|donor|donors|donation|recipient"

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Supplementary Table 2. Newcastle-Ottawa quality assessment scale cohort studies

A study can be awarded a maximum of one star for each numbered item within the Selection and

Outcome categories. A maximum of two stars can be given for Comparability.

Selection	**1) Representativeness of the exposed cohort**	
	□	a) truly representative of the average kidney transplant recipient *****
	□	b) somewhat representative of the average kidney transplant recipient *****
	□	c) selected group
	□	d) no description of the derivation of the cohort
	2) Selection of the control group	
	□	a) drawn from the same community as the exposed cohort *****
	□	b) drawn from a different source
	□	c) no description of the derivation of the non-exposed cohort
	3) Ascertainment of exposure	
	□	a) secure record (eg medical file) *****
	□	b) structured interview *****
	□	c) written self report
	□	d) no description
	4) Demonstration that outcome of interest was not present at start of study	
	□	a) yes *****
	□	b) no
Comparability	**1) Comparability of cohorts on the basis of the design or analysis**	
	□	a) study controls for baseline immunosuppression (TAC vs CsA vs mTORI) *****
	□	b) study controls contemporaneity *****
Outcome	**1) Assessment of outcome**	
	□	a) independent blind assessment *****
	□	b) record linkage *****
	□	c) self report
	□	d) no description
	2) Was follow-up long enough for outcomes to occur	
	□	a) yes (one year) *****
	□	b) no
	3) Adequacy of follow up of cohorts	

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	□	a) complete follow-up of all subjects accounted for *****
	□	b) subjects lost to follow up unlikely to introduce bias: small number lost > 90% follow up, or description provided of those lost) *****
	□	c) follow up rate < 90% and no description of those lost
	□	d) no statement

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Supplementary Table 3. Bias assessment

Study	selection	comparability	outcome	bias item(s)
maximum score	****	**	***	
Ashimine, 2014 (18)	****	-	***	calcineurin inhibitor contemporaneity
Barnett, 2013 (37)	****	*	***	calcineurin inhibitor
Becker, 2015 (28)	****	*	***	calcineurin inhibitor
Bennani, 2016 (38)	****	**	**	follow-up
Bentall, 2014 (39)	****	**	***	-
Flint, 2011 (40)	****	**	***	-
Genberg, 2008 (1)	****	**	***	-
Habicht, 2011 (29)	****	**	***	-
Hatekeyama, 2014 (6)	****	**	***	-
Hwang, 2013 (41)	****	**	***	-
Iwai, 2015 (42)	****	**	**	follow-up
Jha, 2016 (43)	****	*	**	calcineurin inhibitor follow-up
Kauke, 2016 (44)	****	*	***	calcineurin inhibitor
Kim, 2017 (45)	****	*	***	contemporaneity
Kwon, 2016 (46)	****	*	***	contemporaneity
Lee, 2016 (47)	****	**	**	follow-up
Melexopoulou, 2015 (48)	****	*	***	calcineurin inhibitor
Okumi, 2016 (7)	****	**	***	-
Park, 2016 (49)	****	**	***	-
Sanches-Escudero, 2016 (50)	****	**	***	-
Schachtner, 2015 (4)	****	**	***	-
Shin, 2015 (9)	****	**	***	-
Subramanian, 2016 (10)	****	**	***	-
Van Agteren, 2014 (51)	****	**	***	-
Yokoyama, 2016 (52)	****	*	***	calcineurin inhibitor
Zschiedrich, 2016 (5)	****	*	**	contemporaneity follow-up

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Supplementary Table 4.
Follow-up of patients in the included studies and time span of reporting on rejection and infectious complications.

Study	study follow-up (months)	rejection follow-up(months)	infection follow-up (months)
Ashimine, 2014 (2)	ABOi: 36 ABOc: 52	not specified	not specified
Barnett, 2013 (3)	ABOi: 26 ABOc: 33	12	not applicable
Becker, 2015 (4)	ABOi: 22 ABOc: 20	during follow-up	during follow-up
Bennani, 2016 (5)	ABOi: 6 ABOc: 6	6	6
Bentall, 2014 (6)	ABOi: 67 ABOc: 73	12	not applicable
Flint, 2011 (7)	ABOi: 26 ABOc: 22	12	12
Genberg, 2008 (8)	ABOi: 41 ABOc 48	during follow-up	during follow-up
Habicht, 2011 (9)	ABOi: 17 ABOc: 15	during follow-up	during follow-up
Hatekeyama, 2014 (10)	ABOi: 28 ABOc: 37	during follow-up	during follow-up
Hwang, 2013 (11)	24 (no detailed follow-up information)	during follow-up	during follow-up
Iwai, 2015 (12)	ABOi: 39 ABOc: 38	during follow-up	during follow-up
Jha, 2016 (13)	ABOi: 10 ABOc: 17	during follow-up	during follow-up
Kauke, 2016 (14)	12 (no detailed follow-up information)	12	12
Kim, 2017 (15)	ABOi: 27 ABOc: 42	12	during follow-up
Kwon, 2016 (16)	36 (no detailed follow-up information)	not applicable	during follow-up
Lee, 2016 (17)	ABOi: 34	during follow-up	during follow-up

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	ABOc: 36		
Melexopoulou,	ABOi: 74	during follow-up	during follow-up
2015 (18)	ABOc: 78		
Okumi, 2016	ABOi: 48	not applicable	during follow-up
(19)	ABOc: 56		
Park, 2016 (20)	ABOi: 15	12	during follow-up
	ABOc: 15		
Sanches-	ABOi: 21	12	not applicable
Escudero, 2016	ABOc: 21		
(21)			
Schachtner,	ABOi: 42	12	during follow-up
2015 (22)	ABOc: 37		
Shin, 2015 (1)	ABOi: 39	during follow-up	during follow-up
	ABOc: 46		
Subramanian,	29	12	not applicable
2016 (23)	(no detailed follow-up information)		
Van Agteren,	ABOi: 38	not applicable	not applicable
2014 (24)	ABOc: 38		
Yokoyama,	12	12	12
2016 (25)	(no detailed follow-up information)		
Zschiedrich,	ABOi: 58	during follow-up	during follow-up
2016 (26)	ABOc: 48		

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Supplementary Table 5.
Selection of study cohort and control group.

Study	period	study group	selection of controls
Ashimine, 2014 (2)	2005-09	DSA-positive patients excluded	consecutive
Barnett, 2013 (3)	2005-11		consecutive
Becker, 2015 (4)	2005-13	DSA-positive patients excluded	matching 2:1 (ABOc: ABOi): one transplantation directly before and one directly after ABOi procedure
Bennani, 2016 (5)	2011-15		matching: 1:1 gender, age, time of transplantation
Bentall, 2014 (6)	1999-2006	FACS-positive crossmatch excluded	consecutive
Flint, 2011 (7)	2005-08	excluded: • pretransplant rituximab • donor-specific antibodies	matching: immunosuppression
Genberg, 2008 (8)	2001-05	FACS-positive crossmatch excluded	matching: initial immunosuppresive therapy
Habicht, 2011 (9)	2007-09	FACS-positive crossmatch excluded	consecutive
Hatekeyama, 2014 (10)	2006-13		consecutive
Hwang, 2013 (11)	2009-11		matching: initial immunosuppresive therapy
Iwai, 2015 (12)	2001-14	all recipients aged >60 years with a spousal transplant	consecutive
Jha, 2016 (13)	2011-14		consecutive
Kauke, 2016 (14)	2007-12	DSA-positive patients excluded	matching: maintenance immunosuppresive therapy
Kim, 2017 (15)	2010-16	DSA-positive patients excluded	matching: maintenance immunosuppresive therapy
Kwon, 2016 (16)	2012-15	FACS-positive crossmatch excluded	matching: maintenance immunosuppresive therapy

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Lee, 2016 (17)	2010-14	FACS-positive crossmatch excluded 43 ABOc patients were excluded because of rituximab treatment	matching: maintenance immunosuppresive therapy
Melexopoulou, 2015 (18)	2005-13		matching 1:1: 'randomly selected on the basis of similar baseline demographic and clinical characteristics of donors and recipients'
Okumi, 2016 (19)	2005-13	FACS-positive crossmatch excluded	consecutive
Park, 2016 (20)	2011-13	all spousal transplants	consecutive
Sanches-Escudero, 2016 (21)	2011-13		consecutive
Schachtner, 2015 (22)	2005-12		matching: • basiliximab induction therapy • maintenance immunosuppression • availability of virology screening
Shin, 2015 (1)	2009-12	FACS-positive crossmatch excluded	consecutive
Subramanian, 2016 (23)	2007-12		matching not described
Van Agteren, 2014 (24)	2006-12		matching 2:1 (ABOc: ABOi) • Age • number of HLA mismatches
Yokoyama, 2016 (25)	2008-13		consecutive
Zschiedrich, 2016 (26)	2004-14	ciclosporin-treated patients excluded	consecutive

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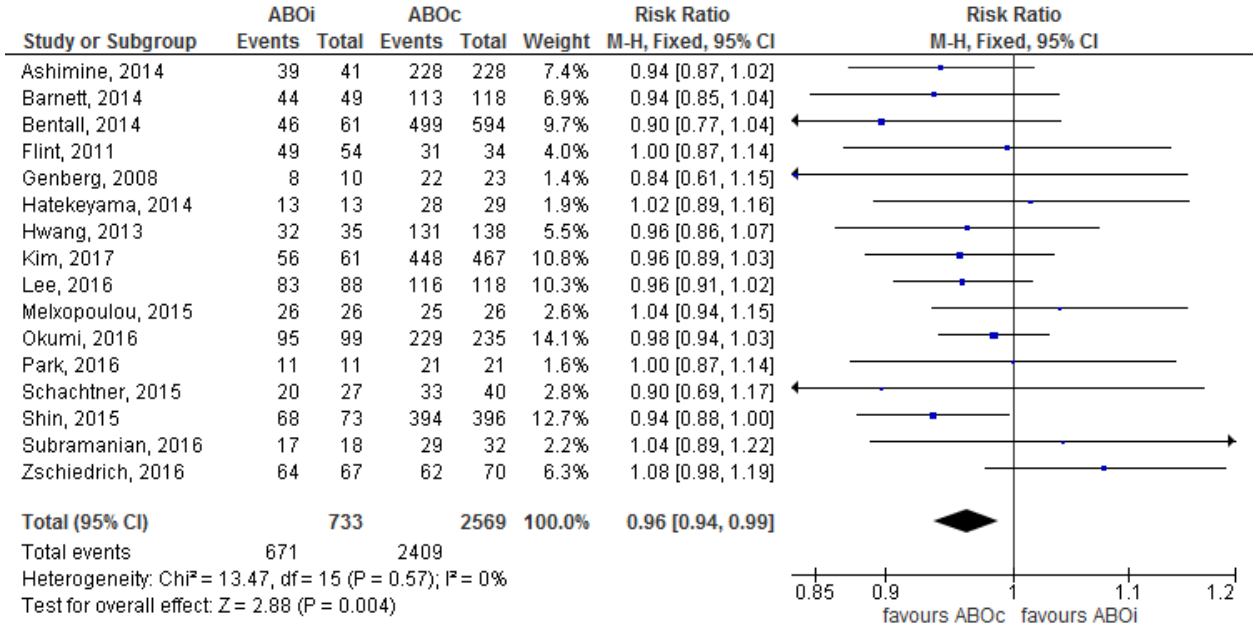
Supplementary Figure 1. Forest plot of comparison: ABO-incompatible kidney transplantation versus center-matched ABO-compatible control patients; outcome: graft survival uncensored year 3.



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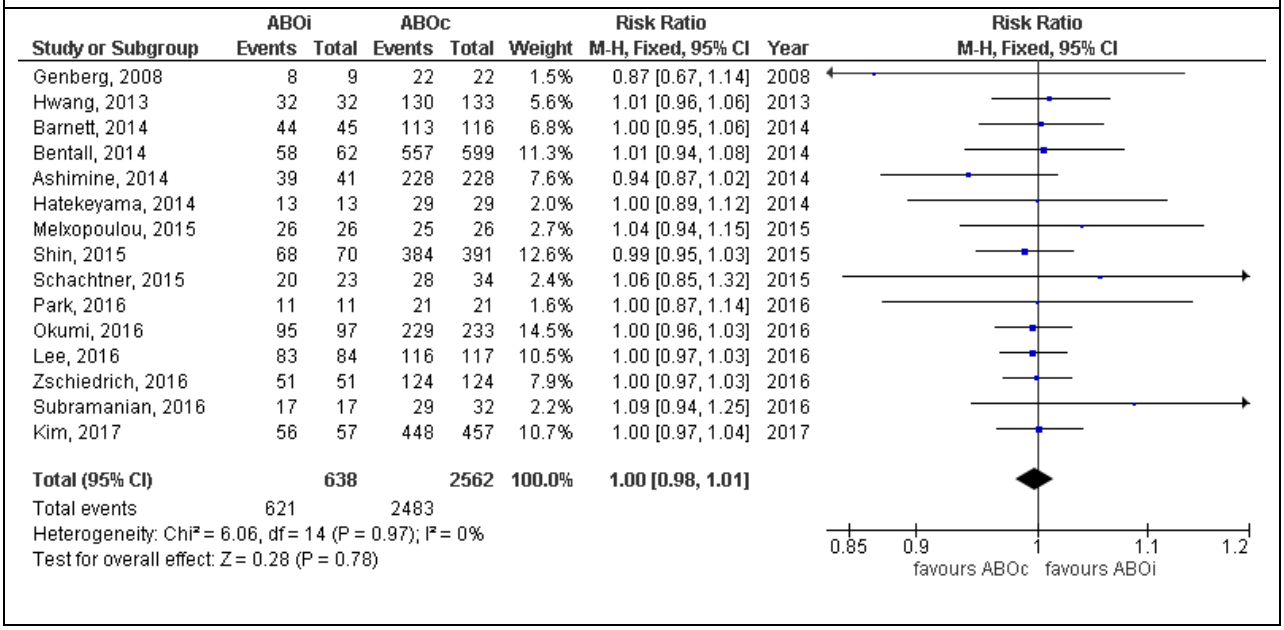
Supplementary Figure 2. Forest plot of comparison: ABO-incompatible kidney transplantation versus center-matched ABO-compatible control patients; outcome: graft survival uncensored between year one and year three.



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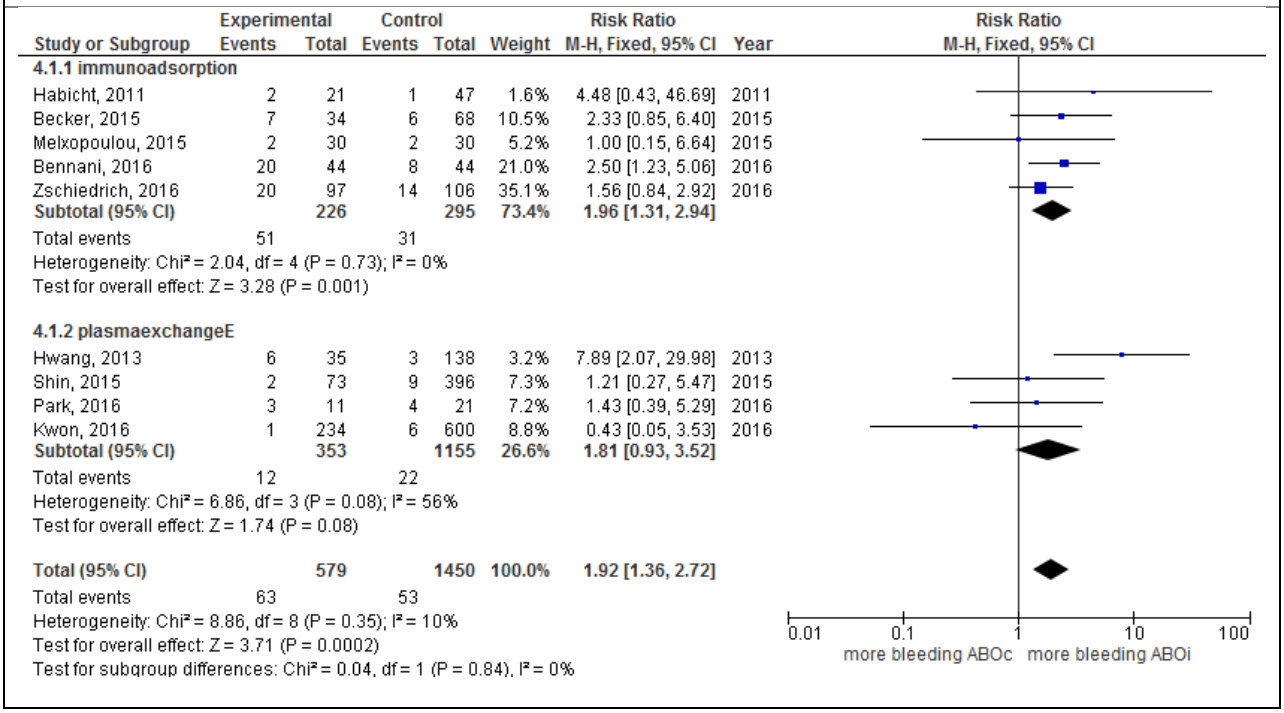
Supplementary Figure 3. Forest plot of comparison: ABO-incompatible kidney transplantation versus center-matched ABO-compatible control patients; outcome: bleeding.

Subgroup analysis: plasmapheresis versus immunoadsorption.