



## Supplemental Materials for

### Effect of biocompatible peritoneal dialysis solution on residual renal function: a systematic review of randomized controlled trials

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**Supplemental Table 1: Each characteristic of 11 studies included in the systematic review (SR)**

A. Bajo 2011 (44)

Methods	<p>Country: Spain</p> <p>Setting/Design: RCT, open labeled, multi center trial</p> <p>Time frame: No statement</p> <p>Randomization method: No statement</p> <p>Intention-to-treat: No</p> <p>Follow-up period: 24 months</p> <p>Loss to follow-up: 12/33 (36%)</p>
Participants	<p>INCLUSION CRITERIA</p> <p>Incident CAPD patients</p> <p>OVERALL STUDY POPULATION</p> <p>Number: 33 (new PDS : conventional PDS group = 13:20)</p> <p>Age: new PDS group : 62 ± 11 years</p> <p style="padding-left: 40px;">conventional PDS group : 59 ± 15 years</p> <p>Sex (M/F): 19/14</p>
Interventions	<p>TREATMENT GROUP</p> <p>Balance® (Fresenius)</p>



	CONTROL GROUP
	Stay safe <sup>®</sup> (Fresenius)
Outcomes	<p>1. Primary outcome</p> <p>(1) RRF</p> <p>(2) peritonitis</p> <p>(3) creatinine MTAC</p> <p>(4) ultrafiltration capacity</p> <p>(5) EMT marker</p> <p>2. Secondary outcome</p> <p>(1) technical survival</p> <p>(2) peritonitis</p> <p>3. Check cycle</p> <p>6, 12, 18, 24 months</p>
RRF measurement	<p>1) Method of measurement: <math>C_{Cr}</math> and <math>C_{urea}</math></p> <p>2) Unit: mL/min</p>
Notes	MTAC: mass transfer area coefficients
B. Cho 2013 (45)	
Methods	<p>Country: Republic of Korea</p> <p>Setting/Design: RCT, open labeled, multi center trial</p> <p>Time frame: April 2001 ~ December 2003</p> <p>Randomization method: No statement</p> <p>Intention-to-treat: No</p> <p>Follow-up period: 12 months</p> <p>Loss to follow-up: 19/79 (24%)</p>
Participants	<p>INCLUSION CRITERIA</p> <p>Incident CAPD patients</p>



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OVERALL STUDY POPULATION

Number: 60 (new PDS : conventional PDS group = 32:28)

Age: new PDS group : 51.5 ± 12.8 years

conventional PDS group : 51.1 ± 14.2 years

Sex (M/F): 32/28

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Interventions TREATMENT GROUP

Balance<sup>®</sup> (Fresenius)

CONTROL GROUP

Stay safe<sup>®</sup> (Fresenius)

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Outcomes 1. Primary outcome

(1) daily UV, daily UF volume

(2) daily peritoneal glucose absorption

(3) residual renal function, dialysis adequacy

(4) modified 4.25% PET

(5) laboratory blood chemistry, CA125, IL-6

2. Secondary outcome

effluent biomarkers

3. Check cycle

1, 6, 12 months

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RRF measurement 1) Method of measurement:  $C_{Cr}$  and  $C_{urea}$

2) Unit: mL/min/1.73m<sup>2</sup>

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Notes UV: urinary volume

UF: ultrafiltration

PET: peritoneal equilibration test

CA125: cancer antigen 125

IL-6: interleukin-6



C. Choi 2008 (26)

Methods	<p>Country: Republic of Korea</p> <p>Setting/Design: RCT, open labeled, single center trial</p> <p>Time frame: No statement</p> <p>Randomization method: No statement</p> <p>Intention-to-treat: No</p> <p>Follow-up period: 12 months</p> <p>Loss to follow-up: 36/104 (35%)</p>
Participants	<p>INCLUSION CRITERIA</p> <p>Adults receiving CAPD therapy</p> <p>OVERALL STUDY POPULATION</p> <p>Number: 104 (new PDS : conventional PDS group = 51:53)</p> <p>Age: new PDS group : 52.6 ± 12.4 years</p> <p style="padding-left: 20px;">conventional PDS group : 55.4 ± 11.9 years</p> <p>Sex (M/F): 47/57</p>
Interventions	<p>TREATMENT GROUP</p> <p>Balance<sup>®</sup> (Fresenius)</p> <p>CONTROL GROUP</p> <p>Stay safe<sup>®</sup> (Fresenius, Bad Homburg, Germany),</p> <p>Dianeal<sup>®</sup> (Baxter)</p> <p>Perisis<sup>®</sup> (Boryung, Seoul, Republic of Korea)</p>
Outcomes	<p>1. Primary outcome</p> <p>(1) ratio of dialysate-to-plasma (D/P) creatinine</p> <p>(2) peritoneal ultrafiltration</p> <p>(3) RRF</p> <p>(4) dialysis adequacy indices</p>



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	(5) effluent CA125
	2. Check cycle
	4, 8, 12 months
RRF measurement	1) Method of measurement: $C_{cr}$ and $C_{urea}$
	2) Unit: mL/min
Notes	Patients included who has used the conventional PDS more than 6 months without any complications
	CAPD: continuous ambulatory peritoneal dialysis
	CA125: cancer antigen 125

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D. Fan 2008 (27)

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Methods	Country: United Kingdom
	Setting/Design: RCT, open labeled
	Time frame: January 2004 to December 2005
	Randomization method: No statement
	Intention-to-treat: Yes
	Follow-up period: 12 months
	Loss to follow-up: 25/118 (21%)
Participants	INCLUSION CRITERIA
	Adults receiving CAPD therapy
	OVERALL STUDY POPULATION
	Number: 118 (new PDS : conventional PDS group =57:61)
	Age: new PDS group : $51.6 \pm 2.0$ years
	conventional PDS group : $54.2 \pm 1.9$ years
	Sex (M/F): 47/57
Interventions	TREATMENT GROUP

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	Balance <sup>®</sup> (Fresenius), Physioneal <sup>®</sup> (Baxter) CONTROL GROUP Stay safe <sup>®</sup> (Fresenius, Bad Homburg, Germany), Dianeal <sup>®</sup> (Baxter)
Outcomes	1. Primary outcome RRF 2. Secondary outcome (1) peritonitis rate (2) PD technique survival (3) Changes in peritoneal membrane function assessed by PET (4) Biomarker of inflammation, CRP 3. Check cycle 3, 12 months
RRF measurement	1) Method of measurement: Mean of C <sub>cr</sub> and C <sub>urea</sub> 2) Unit: L/week/1.73m <sup>2</sup>
Notes	PET: peritoneal equilibrium test CRP: C-reactive protein APD: automated peritoneal dialysis New PDS group : 23 CAPD, 34 APD patients Conventional PDS group: 24 CAPD, 37 APD patients
E. Haag-Weber 2010 (24)	
Methods	Country: Germany, France, Austria Setting/Design: RCT, open labeled, multicenter trial Time frame: 1999 to 2005 Randomization method: No statement Intention-to-treat: No



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	Follow-up period: 18 months
	Loss to follow-up: 30/69 (35%)
Participants	<b>INCLUSION CRITERIA</b> Adults receiving CAPD therapy <b>OVERALL STUDY POPULATION</b> Number: 69 (new PDS : conventional PDS group =43:26) Age: new PDS group : 52.6 ± 12.4 years conventional PDS group : 55.4 ± 11.9 years Sex (M/F): 40/29
Interventions	<b>TREATMENT GROUP</b> Gambrosol trio® (Gambro AB, Lund, Sweden) <b>CONTROL GROUP</b> Gambrosol® (Gambro), Stay safe® (Fresenius, Bad Homburg, Germany), Dianeal® (Baxter, Unterschleißheim, Germany)
Outcomes	1. Primary outcome (1) RRF (2) fluid balance (3) CRP, albumin (4) phosphate, calcium (5) CA125 (6) membrane transport (7) peritonitis episodes 2. Check cycle Every 4 to 6 week
RRF measurement	1) Method of measurement: Mean of C <sub>cr</sub> and C <sub>urea</sub>

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	2) Unit: mL/min/1.73m <sup>2</sup>
Notes	<p>Patients included who has GFR ≥ 3mL/min or Ccr ≥6mL/min</p> <p>Patients excluded who were pregnant or lactating or had several peritonitis episodes in the past or cancer.</p>
F. Johnson 2012 (30)	
Methods	<p>Country: Australia, Singapore, New Zealand</p> <p>Setting/Design: RCT, open labeled, multi center trial</p> <p>Time frame: No statement (2 years)</p> <p>Randomization method: Yes</p> <p>Intention-to-treat: Yes</p> <p>Follow-up period: 12, 24 months</p> <p>Loss to follow-up: 15/182 (8%)</p>
Participants	<p>INCLUSION CRITERIA</p> <p>ESRD patients with RRF ≥5</p> <p>OVERALL STUDY POPULATION</p> <p>Number: 167 (new PDS : conventional PDS group =85:82)</p> <p>Age: new PDS group : 59.3 years</p> <p style="padding-left: 40px;">conventional PDS group : 57.9 years</p> <p>Sex (M/F): 100/82</p>
Interventions	<p>TREATMENT GROUP</p> <p>Balance<sup>®</sup> (Fresenius)</p> <p>CONTROL GROUP</p> <p>Stay safe<sup>®</sup> (Fresenius)</p>
Outcomes	<p>1. Primary outcome</p> <p>Slope of renal function decline</p> <p>2. Secondary outcome</p>



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- (1) time to anuria
  - (2) fluid volume status
  - (3) peritonitis-free survival
  - (4) technique survival
  - (5) patient survival and adverse events
3. Check cycle
- 3, 6, 9, 12, 18, 24 months

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RRF measurement

- 1) Method of measurement: Mean of  $C_{cr}$  and  $C_{urea}$
- 2) Unit: mL/min/1.73m<sup>2</sup>

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G. Kim 2009 (25) and Kim 2012 (28)

Methods	<p>Country: Republic of Korea</p> <p>Setting/Design: RCT, open labeled, multicenter trial</p> <p>Time frame: June 2004 to May 2006</p> <p>Randomization method: No statement</p> <p>Intention-to-treat: Yes</p> <p>Follow-up period: 12 months</p> <p>Loss to follow-up: 22/91 (24%)</p>
Participants	<p>INCLUSION CRITERIA</p> <p>Adults receiving CAPD therapy</p> <p>OVERALL STUDY POPULATION</p> <p>Number: 91 (new PDS : conventional PDS group =48:43)</p> <p>Age: new PDS group : 52.6 ± 12.4 years</p> <p style="padding-left: 20px;">conventional PDS group : 55.4 ± 11.9 years</p> <p>Sex (M/F): 55/36</p>
Interventions	<p>TREATMENT GROUP</p> <p>Balance<sup>®</sup> (Fresenius)</p> <p>CONTROL GROUP</p> <p>Stay safe<sup>®</sup> (Fresenius, Bad Homburg, Germany)</p>
Outcomes	<p>1. Primary outcome</p> <p style="padding-left: 20px;">GFR(glomerular filtration rate)</p> <p>2. Secondary outcome</p> <p style="padding-left: 20px;">(1) urine volume</p> <p style="padding-left: 20px;">(2) survival</p> <p style="padding-left: 20px;">(3) clinical laboratory data</p> <p>2. Check cycle</p>



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	6, 12 months / 24 months
RRF measurement	1) Method of measurement: Mean of $C_{cr}$ and $C_{urea}$ 2) Unit: L/week/1.73m <sup>2</sup>
Notes	Analysis by the mixed model with adjustments for age, gender, Davies score and GFR at Month 1

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H. Lai 2012 (29)

Methods	<p>Country: Hong Kong</p> <p>Setting/Design: RCT, open labeled, multicenter trial</p> <p>Time frame: Start (July 2003 to 2005), 30 months + 12~16 months</p> <p>Randomization method: No statement</p> <p>Intention-to-treat: Yes</p> <p>Follow-up period: 30+12~16 months (average 45 months)</p> <p>Loss to follow-up: 25/125 (20%)</p>
Participants	<p>INCLUSION CRITERIA</p> <p>Adults receiving CAPD therapy</p> <p>OVERALL STUDY POPULATION</p> <p>Number: 125 (new PDS : conventional PDS group =58:67)</p> <p>Age: new PDS group : 58.6 years                conventional PDS group : 61.9 years</p> <p>Sex (M/F): 69/56</p>
Interventions	<p>TREATMENT GROUP</p> <p>Balance<sup>®</sup> (Fresenius)</p> <p>Gambrosol trio<sup>®</sup> (Gambro AB)</p> <p>Physioneal<sup>®</sup> (Baxter)</p> <p>CONTROL GROUP</p> <p>ANDY-Disc<sup>®</sup> (Fresenius)</p> <p>Dianeal<sup>®</sup> (Baxter)</p>
Outcomes	<p>1. Co-primary outcome</p> <p>(1) cytokines</p> <p>(2) growth factor</p>



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(3) adipokine

(4) cardiac biomarker

(5) GFR(RRF)

(6) urine output

2. Check cycle

15 months

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RRF measurement 1) Method of measurement: Mean of  $C_{cr}$  and  $C_{urea}$

2) Unit: mL/min/1.73m<sup>2</sup>

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I. Park 2012 (23)

Methods	<p>Country: Republic of Korea</p> <p>Setting/Design: RCT, open labeled, multicenter trial</p> <p>Time frame: October 2005 to April 2007</p> <p>Randomization method: No statement</p> <p>Intention-to-treat: No statement</p> <p>Follow-up period: 12 months</p> <p>Loss to follow-up: 35/146 (24%)</p>
Participants	<p>INCLUSION CRITERIA</p> <p>Adults receiving CAPD therapy</p> <p>OVERALL STUDY POPULATION</p> <p>Number: 146 (new PDS : conventional PDS group =79:67)</p> <p>Age: new PDS group : 52.2 ± 11.4 years                conventional PDS group : 52.6 ± 11.1 years</p> <p>Sex (M/F): 67/79</p>
Interventions	<p>TREATMENT GROUP</p> <p>Balance<sup>®</sup> (Fresenius)</p> <p>CONTROL GROUP</p> <p>Stay safe<sup>®</sup> (Fresenius)</p>
Outcomes	<p>1. Primary outcome</p> <p>(1) IEDI</p> <p>(2) composite score</p> <p>2. Secondary outcome</p> <p>(1) sICAM-1</p> <p>(2) sVCAM-1</p> <p>(3) RRF</p>



	(4) Characteristics of peritoneal membrane transport (5) ultrafiltration volume (6) nutritional parameter 3. Check cycle 6, 12 months
RRF measurement	1) Method of measurement: Mean of $C_{cr}$ and $C_{urea}$ 2) Unit: mL/min
Notes	IEDI: inflammation and endothelial dysfunction sICAM: soluble intercellular adhesion molecule sVCAM: soluble vascular cellular adhesion molecule
J. Szeto 2007 (21)	
Methods	Country: Hong Kong, China Setting/Design: RCT Time frame: No statement Randomization method: Yes Intention-to-treat: No statement Follow-up period: 12 months Loss to follow-up: 2/50 (4%)
Participants	INCLUSION CRITERIA Adults receiving CAPD therapy OVERALL STUDY POPULATION Number: 50 (new PDS : conventional PDS group =25:25) Age: new PDS group : $60.9 \pm 11.2$ years conventional PDS group : $55.0 \pm 13.7$ years Sex (M/F): 30/20
Interventions	TREATMENT GROUP





	Balance <sup>®</sup> (Fresenius, Germany)
	CONTROL GROUP
	Stay safe <sup>®</sup> (Fresenius)
Outcomes	<p>1. Primary outcome</p> <p>(1) peritoneal transport</p> <p>(2) serum inflammatory marker</p> <p>(3) PDE</p> <p>2. Secondary outcome</p> <p>(1) nutritional and adequacy indices</p> <p>(2) RRF</p> <p>(3) peritonitis-free survival</p> <p>(4) hospitalization and actuarial and technique survival</p> <p>2. Check cycle</p> <p>4, 8, 16, 24, 32, 40, 52 weeks</p>
RRF measurement	<p>1) Method of measurement: Mean of <math>C_{cr}</math> and <math>C_{urea}</math></p> <p>2) Unit: mL/min/1.73m<sup>2</sup></p>
Notes	<p>Patients excluded who were unlikely to survive, planned to have elective living-related kidney transplant or transfer to other renal center within 6 months.</p> <p>PDE: PD effluent</p>
K. Williams 2004 (22)	
Methods	<p>Country: 11 countries in Europe</p> <p>Setting/Design: RCT, open labeled, multicenter trial, cross-over study</p> <p>Time frame: No statement</p> <p>Randomization method: No statement</p>



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	Intention-to-treat: No
	Follow-up period: 6 months (Phase I : 3 months)
	Loss to follow-up: 13/73 (18%)
Participants	<b>INCLUSION CRITERIA</b> Adults receiving CAPD therapy <b>OVERALL STUDY POPULATION</b> Number: 71 (new PDS : conventional PDS group =36:35) Age: new PDS group : 61 (46-68) years conventional PDS group : 57 (51-71) years Sex (M/F): 42/29
Interventions	<b>TREATMENT GROUP</b> Balance® (Fresenius) <b>CONTROL GROUP</b> Stay safe® (Fresenius, Bad Homburg, Germany)
Outcomes	1. Primary outcome (1) CA125 2. Secondary outcome (1) AGE (CML, imidazolone in serum and dialysate) (2) Hyaluronic acid (3) PICP (4) VEGF, TNF alpha, tolerability (5) RRF 3. Check cycle 12, 24 weeks
RRF measurement	1) Method of measurement: Median of $C_{cr}$ and $C_{urea}$ 2) Unit: L/day

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Notes

Results are reported as median (range).

Data at the end of treatment Phase I were extracted considering residual initial PDS effect, because this study has cross-over design.

PICP: procollagen I peptide

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**Supplemental Figure 1: Results of study quality for validity used in this systematic review (Risk of bias summary from Review Manager (Revman 2011; Version 5.1))**

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Bajo 2011	?	?	+	+	●	+	●
Cho 2013	?	?	+	+	+	+	+
Choi 2008	?	?	+	+	●	+	+
Fan 2008	?	?	+	+	+	+	+
Haag-Webeer 2010	+	?	+	+	●	+	+
Johnson 2012	+	+	+	+	+	+	+
Kim 2012	?	?	+	+	+	+	+
Lai 2012	+	?	+	+	+	+	+
Park 2012	?	+	+	+	?	+	+
Szeto 2007	+	+	+	+	?	+	+
Williams 2004	?	?	+	+	●	+	+

