



MINI ECP

Volker Witt
Vienna, Austria

Extracorporeal Photopheresis:

Procedure

1. Leukapheresis
2. MNC treatment with photosensitizer 8-Methoxypsoralen
3. Photoactivation with UVA -light
4. Reinfusion



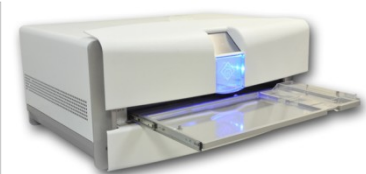
ECP: on-line and off-line methods



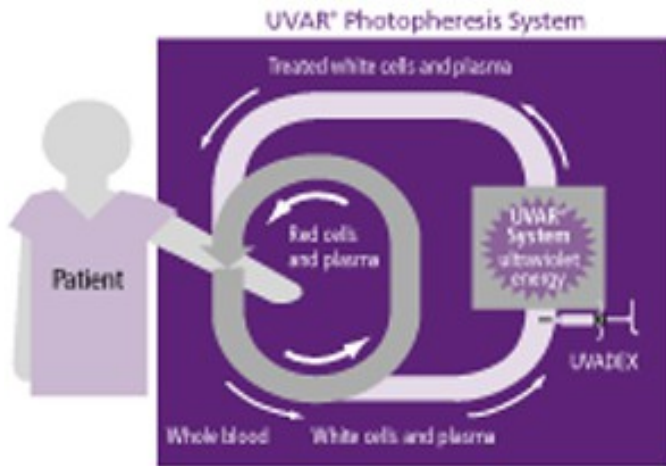
On-line (Therakos)



Off-line: I° step = MNC collection



Off-line: II° step = 8-MOP and UV-A irradiation



Extracorporeal volume of apheresis systems

ECP program from 2005 until 2011

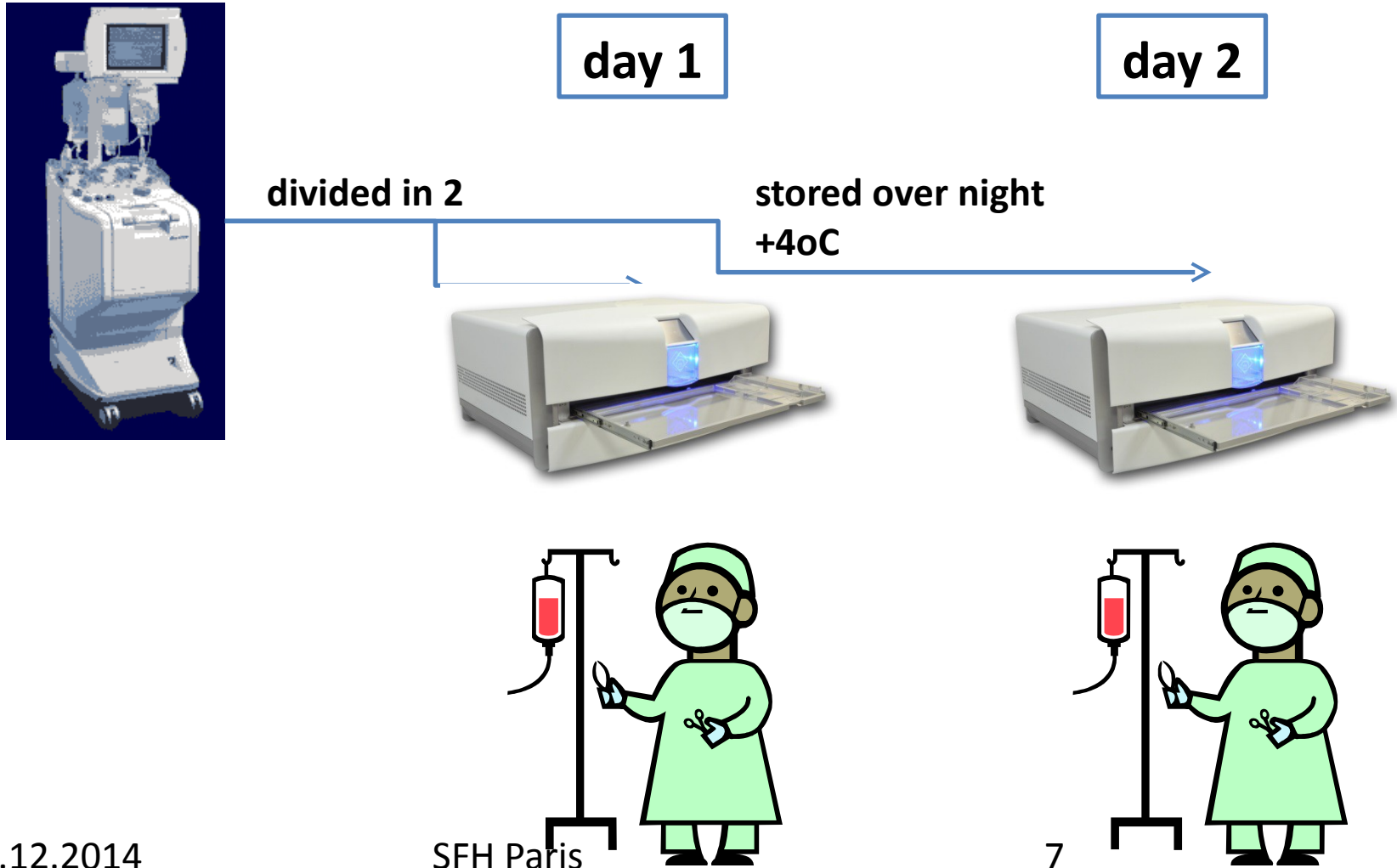
- Patients non responsive to SIT
 - aGVHD
 - cGVHD
- System
 - > 40 kg UVAR XTS
 - (1x Apherese, 2x Reinfusion)
 - < 40 kg AMICUS, Fenwal CS plus COMBI light plus and later on MACOGENIC

UVAR Cellex

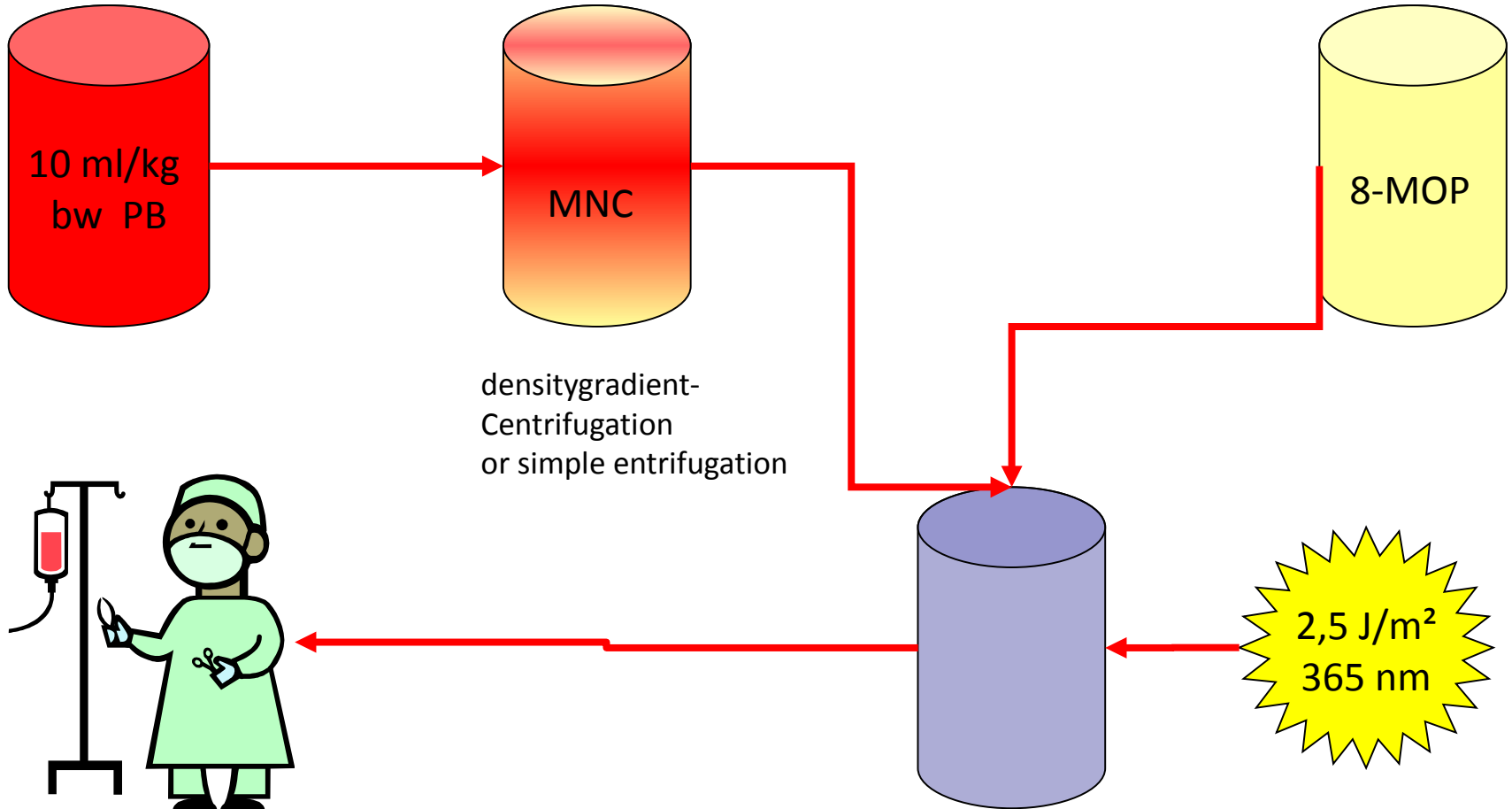
- Double needle or single needle method applicable
- Validation and qualification is done at our department
- 4 patients underwent procedures with the system (28 and 32



ECP program „offline method 1 apheresis 2 reinfusions“



ECP Methods in Children: Mini-ECP

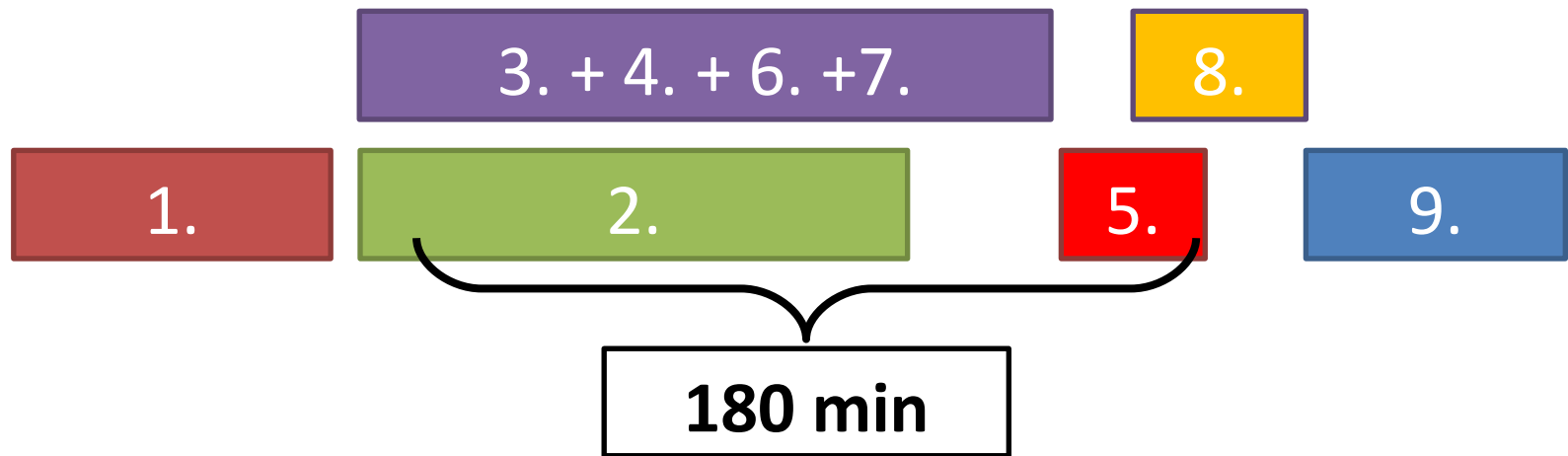


This procedure can only be performed in a GMP laboratory

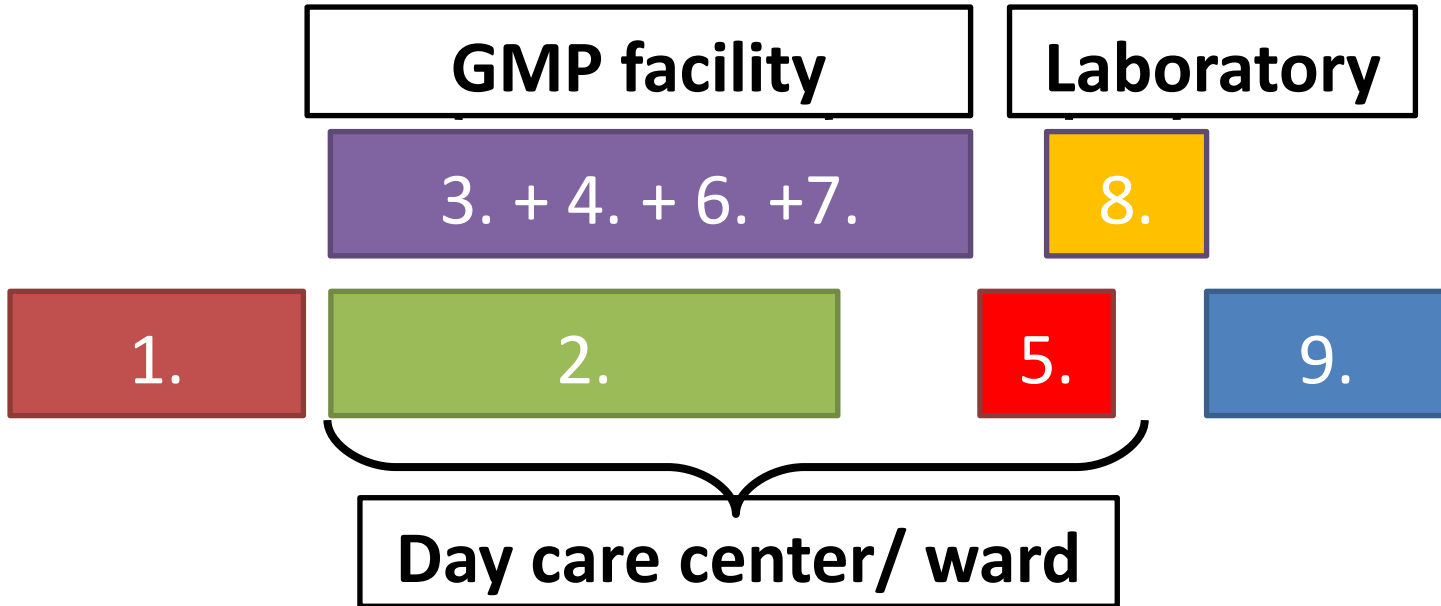
MINI ECP → simple method

1. Drawing blood from peripheral vascular access
2. Fluid substitution with cristalloid solutions if needed
3. Centrifugation of the product
4. Squeezing of the buffy coat
5. Reinfusion of the residual erythrocyte fraction

Time needed



Facility Ressources



MINI ECP in practise



Blood drawing by arterial

puncture



200 ml peripheral blood



Reinfusion by peripheral venous access



12.12.2014

SFH Paris

15

Needs and wants

- Pain management (EMLA™)
- Rapid arterial blood drawing of 200 ml and saline solution as reinfusion
- Attend school while waiting for the buffy
- Out patient setting
- Afternoon visting of Vienna (Zoo, cinema, shopping, etc.)

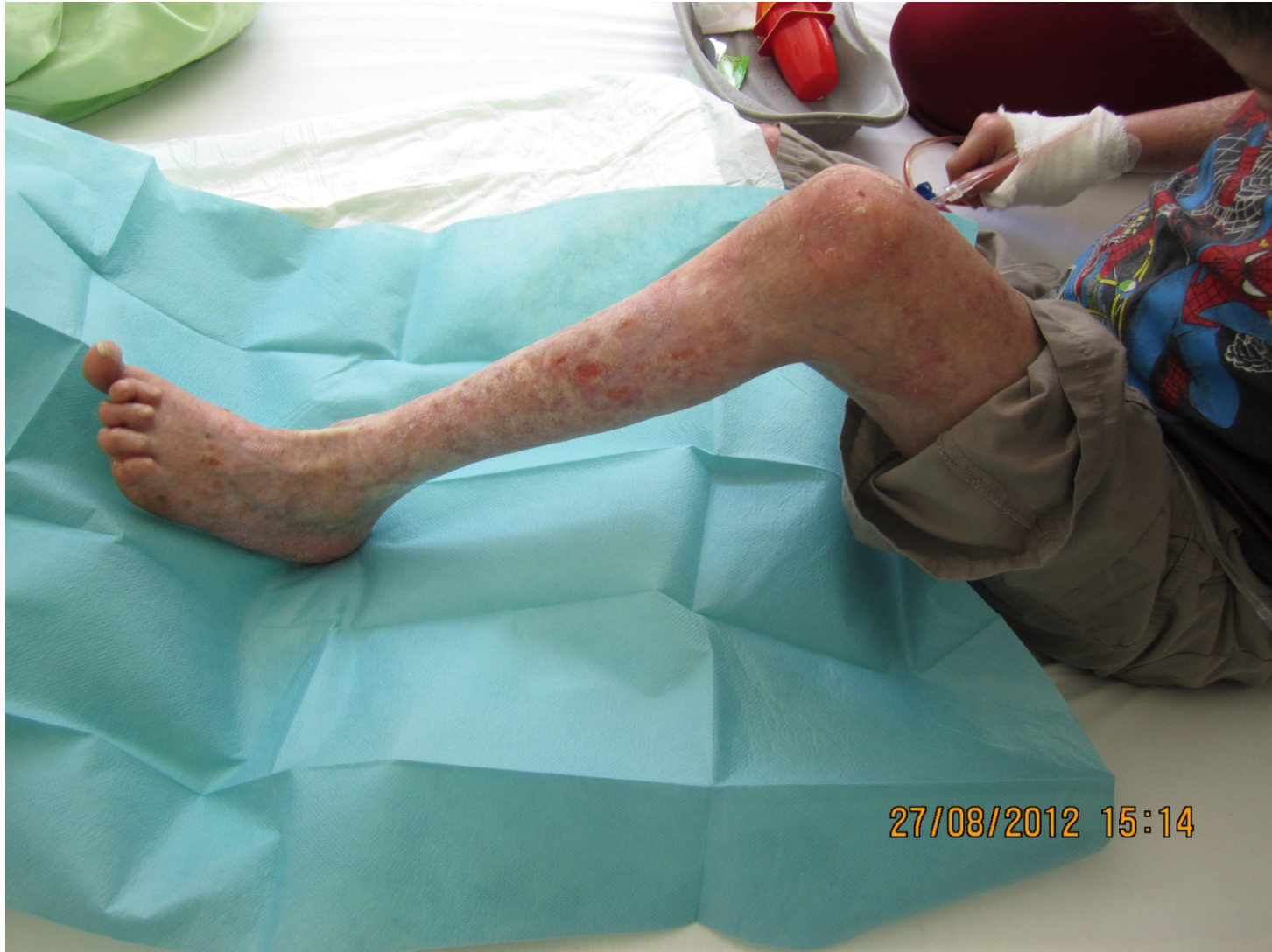
Outcome

- Takes stairs into the second floor
- Ride bicycle 500 to 1000 m
- Attends school at home with success
- No need for out patients care for CVC
- Fully integrated in the social network at home

11 year old boy, 20 kg bw T-Zell Lymphoma, Progerie Syndrome



After 6 treatments 1 reinfusion per week



3. Patient

- SCID (Omenn-Syndrom, RAG1 Mutation), 3y alt, multiple premorbidity pre SCT (viral infections, BCG infection, surgery Ileum resection ,...)
- SCT MUD (BM) 17.12.2013
- Fulminant engraftment (d+13)
- Severe acute GvHD skin/liver/gut:
 - exanthema
 - Bilirubin increase
 - bloody diarrhea (transfusion dependent)
- Nonresponse to IST with steroid, high dose CSA/FK506 and MMF (MMF ex d +28)
 - start MINI ECP d +20 (05.01.2014): 2x/week

Mini ECP in very low bodyweight patients(< 10kg BW)

Cave circulatory !
Monitoring: HF, RR

Hickman ZVK single lumen

10/02/2014 12:15

Bag with ACD-A

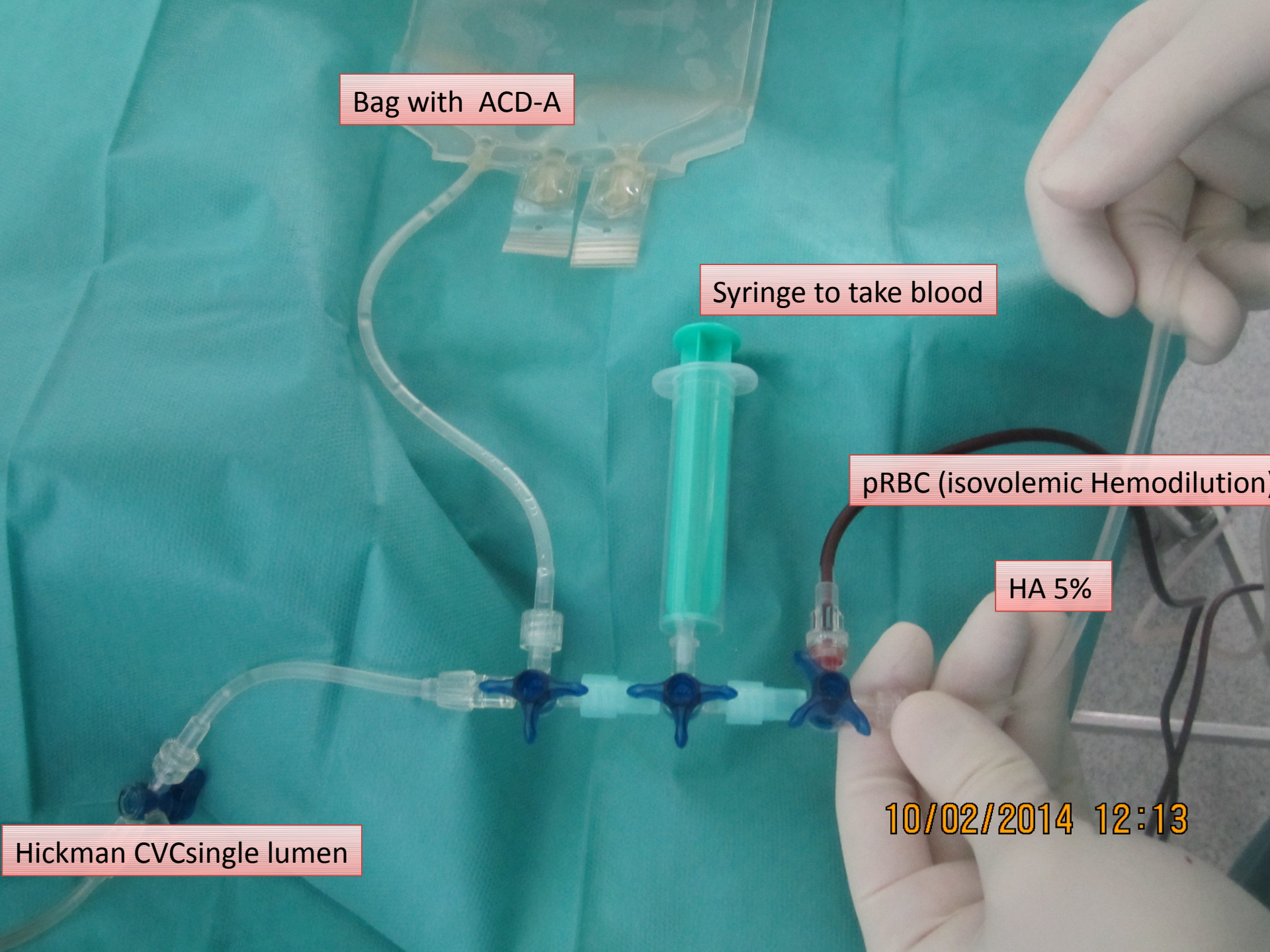
Syringe to take blood

pRBC (isovolemic Hemodilution)

HA 5%

10/02/2014 12:13

Hickman CVC single lumen



steps:

1. Drawing 10ml blood from CVC
2. Direct to sample bag
3. Reinfuse pRBC 1:1 with HA 5%



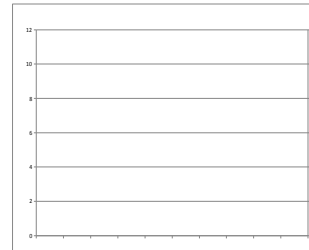
10/02/2014 12:15

outcome

Haut:
remission

Leber:
remission

Darm:
partial
response



Abnahme der Lebergröße
Rückbildung des Exanthems

Steroidreduktion

Celldose

[cellsx10e06/kg bw]

	Lymphocyte	Monocyte	Granulocyte
MINI (n=65)	5,37	2,44	3,99
OFFLINE (n=136)	46,7	20,3	14,9
INLINE*) (n=134)	25,4	6,2	21,8

*)INLINE = UVAR XTS

Adverse Events

	offline	inline
Analysable ECPs	270	438
ECPs with adverse events	20/270; 7,41%	34/438; 7,76%
Patients with adverse events	7/25; 28%	7/19; 36,84%

Side effects and adverse events	offline		inline	
	adverse events	Pat.	adverse events	Pat.
circulatory problems	1/20	1/7	31/34	6/7
nausea, vomiting	6/20	4/7	4/34	2/7
hypocalcemia, cramps	2/20	2/7	0	0
abdominal pain	11/20	4/7	0	0
itching, wheals	2/20	1/7	0	0
cuffing	1/20	1/7	0	0
metallic taste	0	0	1/34	1/7
gastric bleeding	0	0	1/34	1/7

Side effects MINI ECP

- no side effects observed in St. Anna Kinderspital so far (n=200)

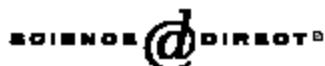
Venous access

- An experienced team in pediatric apheresis should decide on the vascular access to be used
- The decision about the apheresis system used is crucial for the venous or vascular access used.
- „to use what the patient has“ politics

[Fischmeister et.al. BMT 2000]



Available online at www.sciencedirect.com



Transfusion and Apheresis Science 32 (2005) 197–203

TRANSFUSION
AND APHERESIS
SCIENCE

intl.elsevierhealth.com/journals/tras

Small-scale extracorporeal photopheresis for the treatment of cutaneous T-cell lymphoma: A report of 3 cases

T. Schreiner ^{a,*}, A. Gaczkowski ^a, K. Scharffetter-Kochanek ^b, H. Borberg ^a

^a *German Haemapheresis Centre, Maarweg 165, D-50825 Cologne, Germany*

^b *University of Ulm, Department of Dermatology, Maienweg 12, D-89070 Ulm, Germany*

Received 1 October 2004; accepted 1 October 2004

HEMAPHERESIS

Mini buffy coat photopheresis for children and critically ill patients with extracorporeal photopheresis contraindications

Holger Hackstein, Joachim Misterek, Angelika Nockher, Alfred Reiter, Gregor Bein, and Willi Woessmann

TABLE 2. Clinical characteristic of the children treated with mini buffy coat ECP for acute steroid-refractory skin GVHD Grade 3 (overall II°)

Characteristic	Patient 1	Patient 2	Patient 3
Age (years)	2	5	15
Weight (kg)	11	15	33
Diagnosis	AML	MDS; graft rejection	MDS/AML
Stem cell donor	Sibling donor	Haploidentical father	9/10 HLA-matched mother
Stem cell source	Marrow	CD34 positively selected peripheral blood stem cells	Partially CD34 selected peripheral blood stem cells
GVHD prophylaxis	Cyclosporine	OKT-3 CD34 selection	ATG, cyclosporine, methotrexate
GVHD	Isolated skin 3°	Isolated skin 3°	Isolated skin 3°
Start GVHD	Day +28	Day +31	Day +18
Start ECP	Day +32	Day +45	Day +44
Frequency	2-3×/week (11×), then 2×/2 weeks (4×)	2×/week (10×), then 2×/2-3 weeks (13×)	2×/week (18×)
Blood volume treated (mL)	100	100	200
Improvement plus steroid taper after	2 weeks	2 weeks	Initial response, relapse during taper, second response to ECP
Current status	41 months after SCT, alive, well	34 months after SCT, alive, well	32 months after SCT, alive, well

AML = acute myelogenous leukemia; MDS = myelodysplastic syndrome; SCT = stem cell transplantation.



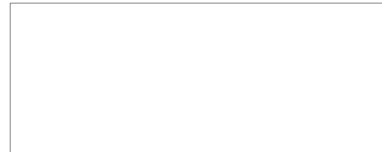
Small scale ECP

Anke M.J. Peters; Pediatric Hematology and Oncology, Freiburg,
Germany

specification

	Schreiner	Hackstein	Anke	Witt
Volume blood treated	100 – 200	100 – 150	50 (> 10 kg) 100 (>30 kg)	100 – 200 (isovolemic HD)
Volume product	300	?	50 - 500	100 - 300
Hct		<3%	<3%	<4%
8-MOP	Volumex0.017	200 ng/ml	200 ng/ml	Volumex0.017
UVA	?	3J/cm ²	2J/cm ²	2.5J/cm ²
Microbiology	?	Tested	Negativ	Tested
Cell count	?	336 10E08 NC	>5 10E06	5 10E06/kg Lymphocytes 3.5 10E06/kg Monocytes 4 10E06/jg Granulocytes

ECP procedures from 2011 to 2014 n= 496



ECP patients St. Anna Kinderspital

38
Patienten

25
offline

19
inline

3
mini

8 + 2 inline
+ 2 mini
acute
GVHD

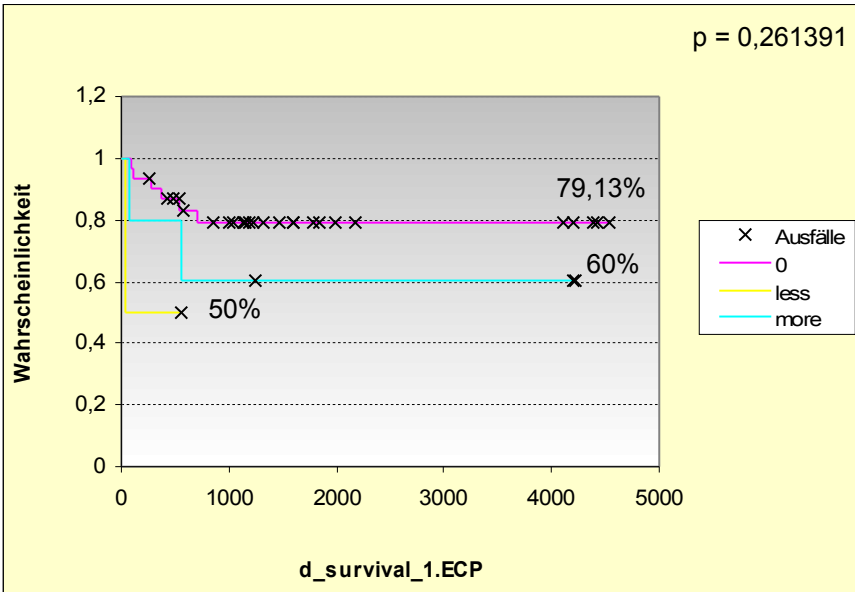
8 + 5 inline
chronic
GVHD

2 + 2 offline
acute
GVHD

10 + 5
offline
chronic
GVHD

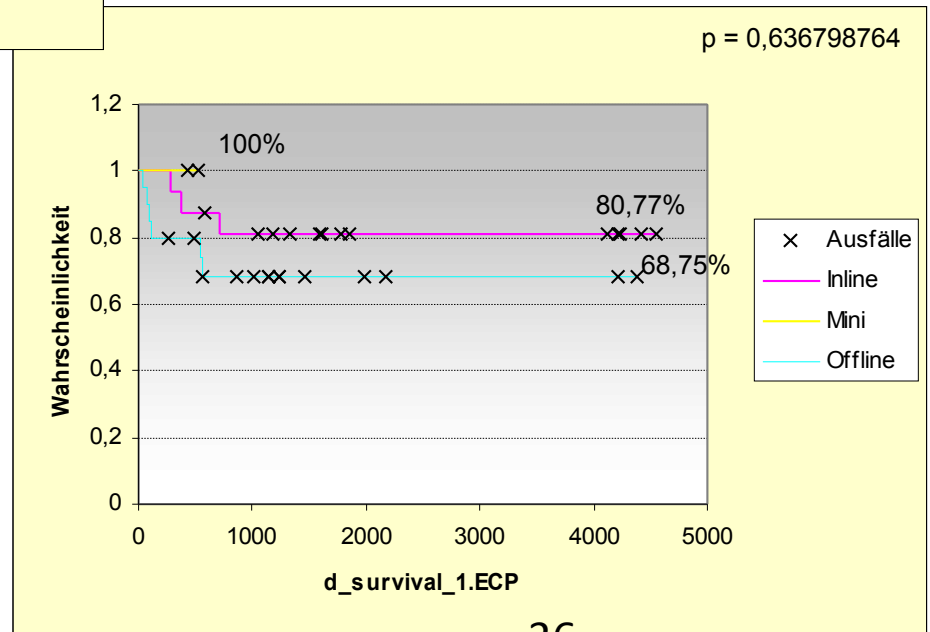
1 + 2 offline
acute
GVHD

Outcome



Response = reduction of
corticoids

ECP-method



ECP FOR ACUTE GVHD WITH DIFFERENT METHODS (MINI; OFFLINE; INLINE) IN PEDIATRIC PATIENTS

Volker Witt, Herbert Pichler, Christina Peters,
Susanne Matthes, Anita Lawitschka, Wolfgang Holter

St. Anna Kinderspital, UKKJ Medical University Vienna, Austria,
Kinderspitalgasse 6, 1090 Vienna, Austria, volker.witt@stanna.at



12.12.2014

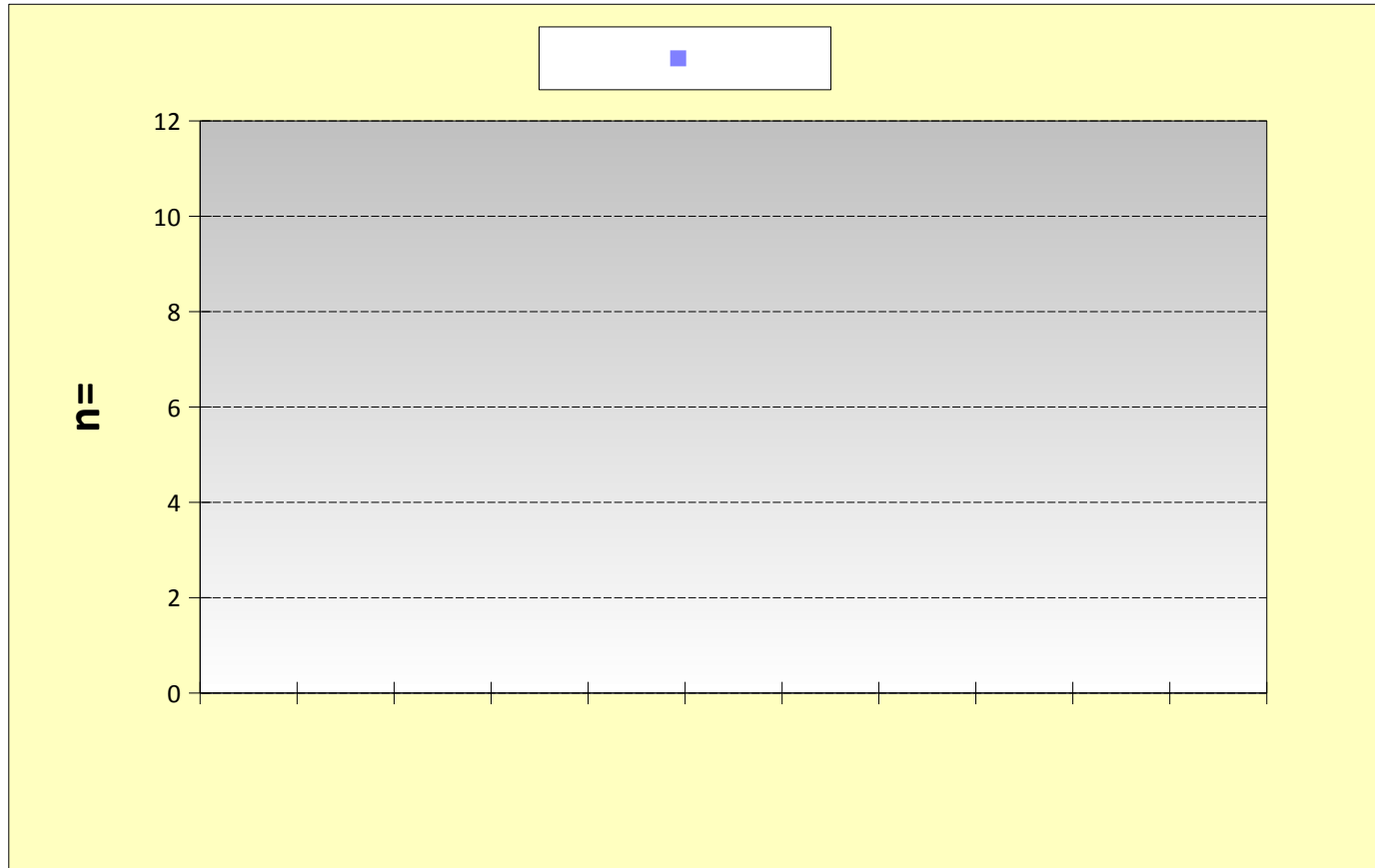
SFH Paris Poster EBMT 2014, Milano



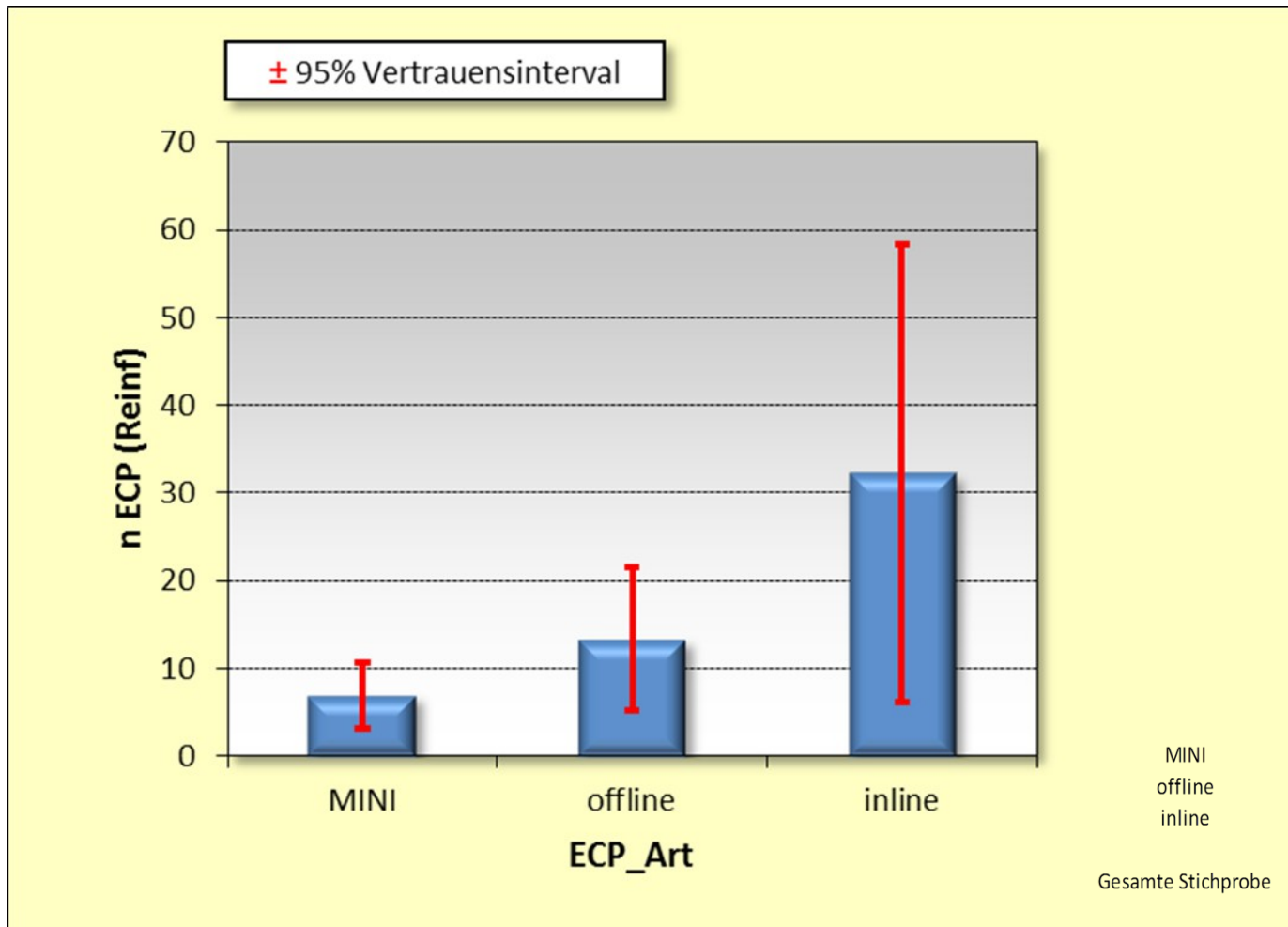
37

n patients	23
age	6.86 a (0.82 – 17.9)
bw	22 kg (7 – 60)
female	11
male	12
Interval Tx => aGVHD	19 d (9 – 87)
Indication for ECP	23 x refractory to SIT
Interval Tx => first ECP	36 d (16 – 90)
Interval aGCHD => first ECP	13 d (3 – 29)
Interval first ECP => last ECP	51 d (9 – 372)
n ECP per patient	10 reinfusion (3 – 55)
GVHD	
Skin	23 (21/23 CR)
Gut	9 (8/9 CR)
Liver	10 (8/10 CR)
Lung	0
response	21/23 (91%)

aGHVD ECP method

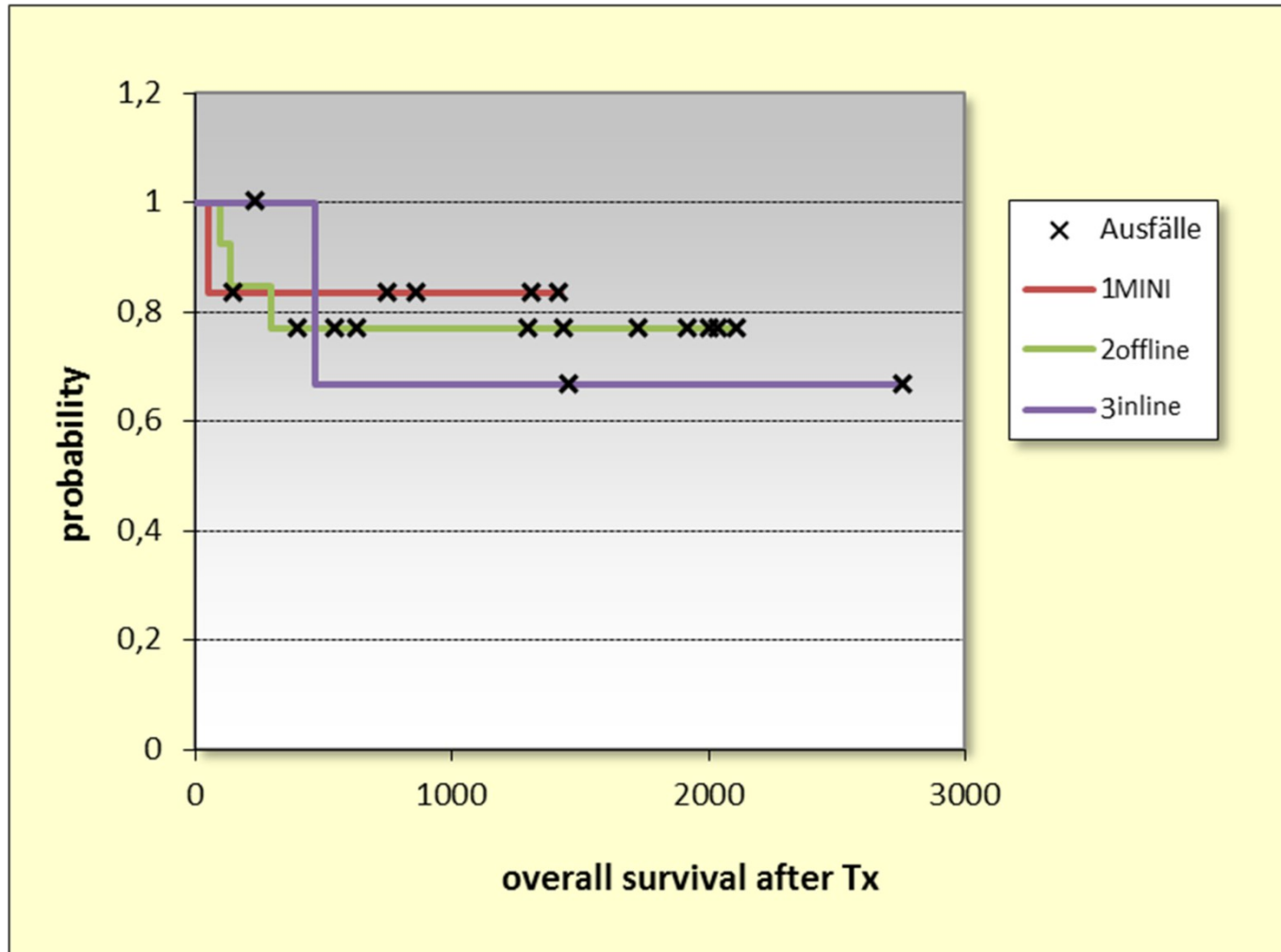


n ECP / patient

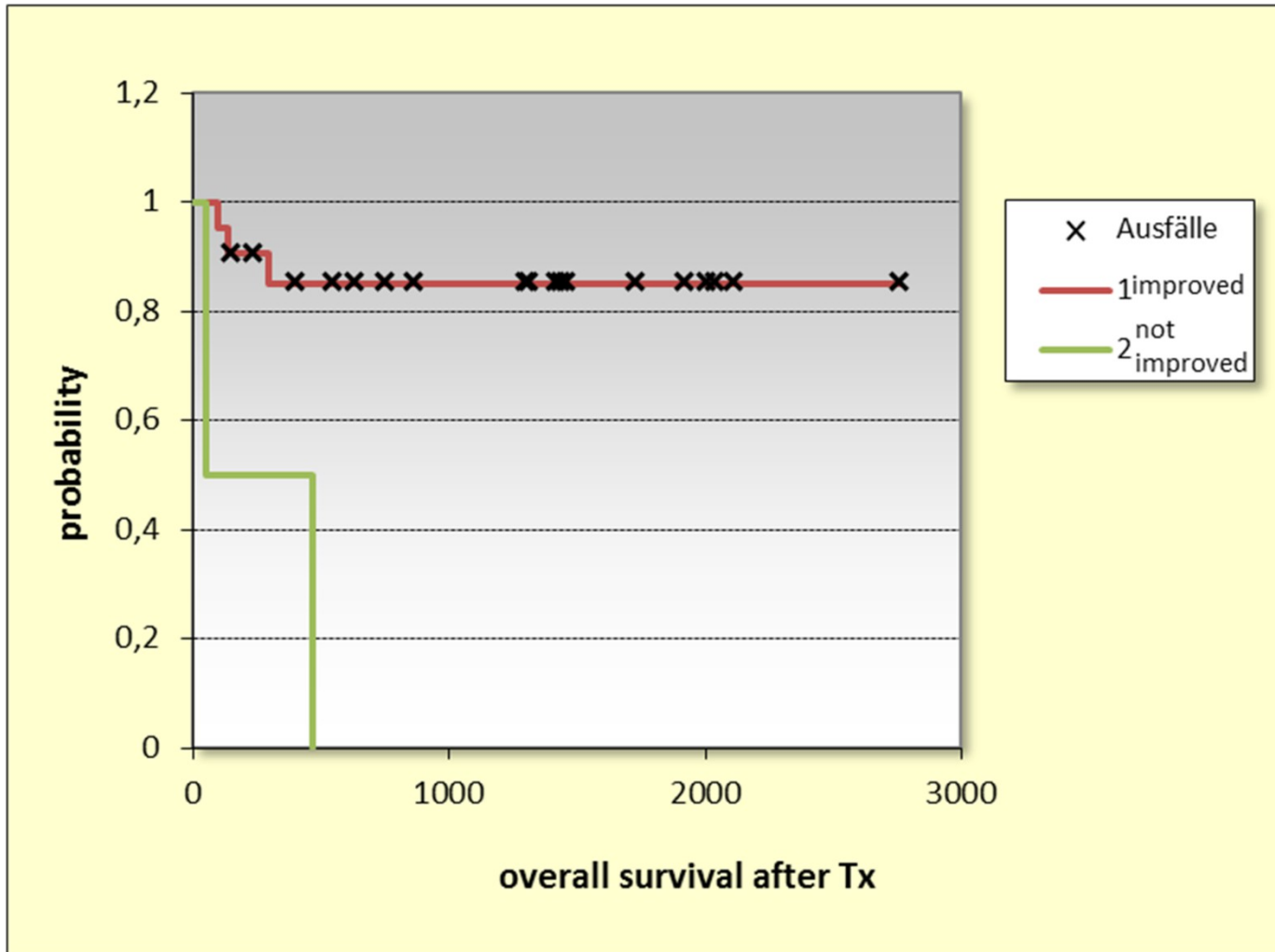


N	Mittelwert
6	7
13	13,38461538
4	32,25
23	15

aGVHD method of ECP



aGVHD response to ECP



Conclusion aGVHD

- **ECP is in our hands an effective second line therapy in acute GVHD. Neither the method used nor the individualized schedule applied seems to influence the outcome. Due to the small patient number, this report could be only a step forward to prospective randomized trials, bringing hopefully an answer to these questions. Interestingly we could show in our collective, that the response to FCP treatment for aGVHD is a**

Conclusion MINI ECP

- Interesting method
- No international agreement or acceptance whether blood, tissue or ATMP regulations should be applied
- Low technical efforts, low economic expenses
=> ? Low budget ECP?
- Data registry needed