CLINICAL SCIENCE

Real-life use of the PEXIVAS reduced-dose glucocorticoid regimen in granulomatosis with polyangiitis and microscopic polyangiitis

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The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Plasma Exchange and Glucocorticoids in Severe ANCA-Associated Vasculitis

N Engl J Med 2020;382:622-31.

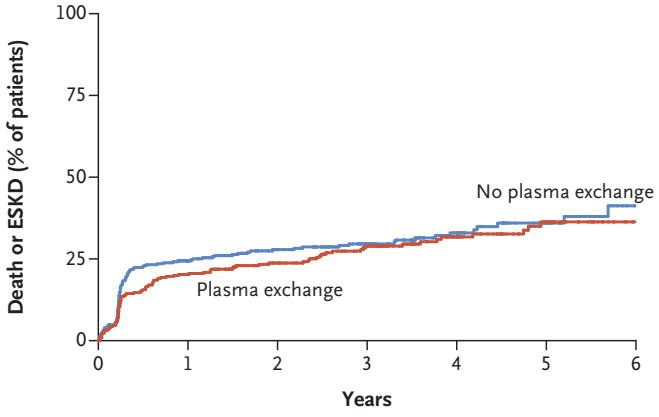
P 新規発症もしくは再燃したGPA, MPA, 患者で、腎病変(eGFR<50)あるいはDHAを有するもの

I PEX+standGC, PEX+redGC

C no PEX+standGC, no PEX+redGC の4群に割り付け

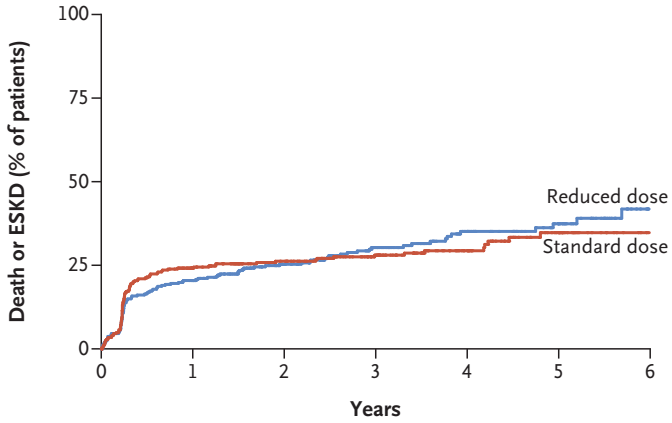
O 死亡あるいはESKDの発生

A Primary Outcome According to Plasma Exchange



No. at Risk							
No plasma exchange	352	244	183	136	82	44	10
Plasma exchange	352	252	186	135	82	43	10

B Primary Outcome According to Glucocorticoid Regimen



No. at Risk							
Reduced dose	353	256	185	133	80	48	9
Standard dose	351	240	184	138	84	39	11

A. PEXは死亡あるいはESKDの発生を減らさなかった

B. 死亡あるいはESKDの発生率において、redGC regimenは非劣性だった

Recommendation

EULAR recommendations for the management of ANCA-associated vasculitis: 2022 update

Ann Rheum Dis 2024;83:30-47.

5 As part of regimens for induction of remission in GPA or MPA, we recommend treatment with oral glucocorticoids at a starting dose of 50–75 mg prednisolone equivalent/day, depending on body weight. We recommend stepwise reduction in glucocorticoids according to table 4 and achieving a dose of 5 mg prednisolone equivalent per day by 4–5 months.

Table 4 Glucocorticoid dosing (mg/day, prednisolone equivalent) with rituximab or cyclophosphamide-based regimens for remission induction in GPA or MPA according to the PEXIVAS Study[93]

	Body weight (kg)		
Weeks	**<50**	**50–75**	**>75**
1*	50	60	75
2	25	30	40
3–4	20	25	30
5–6	15	20	25
7–8	12.5	15	20
9–10	10	12.5	15
11–12	7.5	10	12.5
13–14	6	7.5	10
15–18	5	5	7.5
19–52	5	5	5
>52	Individual taper	Individual taper	Individual taper

*Consider use of intravenous methylprednisolone at a cumulative dose of 1–3 g on days 1–3 in patients with severely active disease, including but not limited to renal involvement with a documented estimated glomerular filtration rate <50 mL/min/1.73 m^2 and/or diffuse alveolar haemorrhage.
GPA, granulomatosis with polyangiitis; MPA, microscopic polyangiitis.

目的

リアルワールドでのPEXIVS reduced-dose GC regimenの有用性を評価する

方法

フランスとルクセンブルクの19施設で
実施された後方視的記述研究

組み入れ基準

1) 15歳以上
2) 2022 ACR/EULAR分類基準に基づき診断された
   新規あるいは再発GPA, MPA患者
3) 生命あるいは機能予後を脅かす重症病態でRTXあるいは
   CYによる寛解導入を要する状態
4) PEXIVASのredGCあるいは、PEXIVAS/CORTAGE/
   フランスのガイドラインでのstandGCを受けた患者
5) 2022/5/6までに治療を開始したGPA or MPA flareの患者

除外基準

1) GPA, MPA以外の血管炎
2) RTXとCYの併用による寛解導入を受けた患者
3) redGCよりもGC積算量が少ないGC治療を受けた患者
4) GCレジメンの情報が不十分な患者
5) アバコパンを併用している患者

アウトカム (全て12か月後に評価)

- **主要評価項目**

複合指標

- 軽度の再燃
- 重度の再燃
- 寛解達成前の悪化
- 12週以上の透析を要するESKD and/or 腎移植
- 死亡

*いずれも寛解導入12か月以内に生じたもの

- 再燃：寛解後に生じた症状の再発あるいは新規出現
- 軽度の再燃*：重要臓器病変がなく機能予後を損なわない再燃
- 重度の再燃*：重要臓器病変あるいは機能予後を損なう再燃
- 寛解達成前の悪化：GCあるいは免疫抑制薬の変更が必要とされる場合。難治性の病態も含まれる。
- 寛解：BVAS (ver. 3) = 0

*PEXIVASにおける定義と同様
(BVAS/WGのmajor itemに影響するかどうか)

アウトカム

- **<u>副次評価項目</u>**

・死亡
・死亡あるいはESKD*
・軽度または重度の再燃
・寛解達成前の悪化
・寛解
・重篤な感染症

*PEXIVASの主要評価項目

GCレジメン — redGC

	Body weight (kg)		
Weeks	**<50**	**50–75**	**>75**
1*	50	60	75
2	25	30	40
3–4	20	25	30
5–6	15	20	25
7–8	12.5	15	20
9–10	10	12.5	15
11–12	7.5	10	12.5
13–14	6	7.5	10
15–18	5	5	7.5
19–52	5	5	5
>52	Individual taper	Individual taper	Individual taper

GCレジメン ― standGC

CORTAGE trial

Conventional Arm			
Days	*No. of weeks*	*Dose (mg/day)*	*Cumulative dose/period (mg)*
1–21	3	60	1260
22–42	3	45	945
43–56	2	30	420
57–84	4	25	700
85–112	4	20	560
113–140	4	17.5	490
141–168	4	15	420
169–253	12	12.5	1050
254–338	12	10	840
339–366	4	9	252
367–394	4	8	224
395–442	4	7	196
443–470	4	6	168
472–499	8	5	280
500–555	8	4	224
556–611	8	3	168
612–667	8	2	112
668–723	8	1	56

Total duration: 728 days, 26 months (104 weeks). Total cumulative dose: 8305 mg

Arthritis Rheumatol 2015;67:1117-1127.

PEXIVAS trial

Week	**Standard**		
	<50 kg	**50-75 kg**	**>75 kg**
	pulse	pulse	pulse
1	50	60	75
2	50	60	75
3-4	40	50	60
5-6	30	40	50
7-8	25	30	40
9-10	20	25	30
11-12	15	20	25
13-14	12.5	15	20
15-16	10	10	15
17-18	10	10	15
19-20	7.5	7.5	10
21-22	7.5	7.5	7.5
23-52	5	5	5
>52	Investigators' Local Practice		

結果

Table 1 Baseline characteristics of the patients (N=234)

Characteristic	N	Overall, N=234*	Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126	P value
Sex	234				0.3†
Male		120/234 (51)	51/108 (47)	69/126 (55)	
Female		114/234 (49)	57/108 (53)	57/126 (45)	
Age (years)	234	64 (51–73)	62 (49–73)	66 (51–73)	0.5†
Age≥65 years	234	109/234 (47)	46/108 (43)	63/126 (50)	0.3†
AAV Type	234				0.001†
GPA		141/234 (60)	77/108 (71)	64/126 (51)	
MPA		93/234 (40)	31/108 (29)	62/126 (49)	
ANCA positivity	234	228/234 (97)	107/108 (99)	121/126 (96)	0.2‡
MPO	234	106/234 (45)	42/108 (39)	64/126 (51)	0.068†
PR3	228	120/228 (53)	63/107 (59)	57/121 (47)	0.076†
BVAS 2003	234	15 (12–21)	16 (12–21)	15 (12–21)	>0.9§
Five-Factor Score	234				0.10†
0		45/234 (19)	26/108 (24)	19/126 (15)	
1		62/234 (26)	31/108 (29)	31/126 (25)	
≥2		127/234 (54)	51/108 (47)	76/126 (60)	
Relapsing disease	234	59/234 (25)	23/108 (21)	36/126 (29)	0.2†

- redGC regimenでMPAの割合、MPO-ANCA陽性の割合が高い
- 20-30%が再燃患者

Characteristic	N	Overall, N=234*	Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126	P value
Vasculitis manifestations					
General symptoms	234	168/234 (72)	80/108 (74)	88/126 (70)	0.5†
Fever	234	59/234 (25)	34/108 (31)	25/126 (20)	0.041†
Asthenia	234	131/234 (56)	59/108 (55)	72/126 (57)	0.7†
Weight Loss	234	66/234 (28)	28/108 (26)	38/126 (30)	0.5†
Articular/muscular involvement	234	98/234 (42)	51/108 (47)	47/126 (37)	0.13†
Skin	234	42/234 (18)	19/108 (18)	23/126 (18)	0.9†
Ear, nose and throat	234	104/234 (44)	59/108 (55)	45/126 (36)	0.004†
Subglottic stenosis	234	9/234 (3.8)	7/108 (6.5)	2/126 (1.6)	0.085‡
Eyes	234	37/234 (16)	23/108 (21)	14/126 (11)	0.033†
Orbital mass	234	5/234 (2.1)	4/108 (3.7)	1/126 (0.8)	0.2‡
Pulmonary involvement	234	113/234 (48)	54/108 (50)	59/126 (47)	0.6†
Lung nodules	234	53/234 (23)	25/108 (23)	28/126 (22)	0.9†
Alveolar haemorrhage	234	63/234 (27)	29/108 (27)	34/126 (27)	>0.9†
Acute respiratory failure	234	8/234 (3.4)	4/108 (3.7)	4/126 (3.2)	>0.9‡
Gastrointestinal tract	234	9/234 (3.8)	7/108 (6.5)	2/126 (1.6)	0.085‡
Peripheral nervous system	234	33/234 (14)	15/108 (14)	18/126 (14)	>0.9†
Central nervous system	234	18/234 (7.7)	14/108 (13)	4/126 (3.2)	0.005†
Cardiac	234	9/234 (3.8)	6/108 (5.6)	3/126 (2.4)	0.3‡
Kidney	234	164/234 (70)	68/108 (63)	96/126 (76)	0.028†
Laboratory features					
Creatinine	234	134 (71–303)	114 (65–291)	178 (80–318)	0.065§
Creatinine≥300 µmol/L	234	59/234 (25)	24/108 (22)	35/126 (28)	0.3†
Creatinine≥500 µmol/L	234	23/234 (9.8)	12/108 (11)	11/126 (8.7)	0.5†
Induction therapy					
High-dose methylprednisolone	234	169/234 (72)	76/108 (70)	93/126 (74)	0.6†
CYC (induction)¶	234	70/234 (30)	30/108 (28)	40/126 (32)	0.5†
RTX (induction)¶	234	174/234 (74)	84/108 (78)	90/126 (71)	0.3†
Plasma exchange	233	40/233 (17)	27/108 (25)	13/125 (10)	0.003†
Dialysis	234	20/234 (8.5)	12/108 (11)	8/126 (6.3)	0.2†
Remission achievement	233	227/233 (97)	106/108 (98)	121/125 (97)	0.7*
Maintenance therapy					
Rituximab	226	208/226 (92)	101/105 (96)	107/121 (88)	0.032†
Cumulative dose of GC (gram)					
After 6 months	211	3225 (2460–4646)	4646 (3966–5381)	2520 (2235–2895)	<0.001†
After 12 months	196	4474 (3270–6015)	5835 (4973–6926)	3360 (3135–3943)	<0.001†

- StandGC regimenで眼/ENT病変が多い
- RedGC regimenで腎病変が多い

<u>血清クレアチニン値</u>

➢ StandGC regimen
- 中央値 1.29 mg/dL
- ≧3.39 mg/dL: 22%
- ≧5.66 mg/dL: 11%

➢ RedGC regimen
- 中央値 2.01 mg/dL
- ≧3.39 mg/dL: 28%
- ≧5.66 mg/dL: 8.7%

Characteristic	N	Overall, N=234*	Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126	P value
Vasculitis manifestations					
General symptoms	234	168/234 (72)	80/108 (74)	88/126 (70)	0.5†
Fever	234	59/234 (25)	34/108 (31)	25/126 (20)	0.041†
Asthenia	234	131/234 (56)	59/108 (55)	72/126 (57)	0.7†
Weight Loss	234	66/234 (28)	28/108 (26)	38/126 (30)	0.5†
Articular/muscular involvement	234	98/234 (42)	51/108 (47)	47/126 (37)	0.13†
Skin	234	42/234 (18)	19/108 (18)	23/126 (18)	0.9†
Ear, nose and throat	234	104/234 (44)	59/108 (55)	45/126 (36)	0.004†
Subglottic stenosis	234	9/234 (3.8)	7/108 (6.5)	2/126 (1.6)	0.085‡
Eyes	234	37/234 (16)	23/108 (21)	14/126 (11)	0.033†
Orbital mass	234	5/234 (2.1)	4/108 (3.7)	1/126 (0.8)	0.2‡
Pulmonary involvement	234	113/234 (48)	54/108 (50)	59/126 (47)	0.6†
Lung nodules	234	53/234 (23)	25/108 (23)	28/126 (22)	0.9†
Alveolar haemorrhage	234	63/234 (27)	29/108 (27)	34/126 (27)	>0.9†
Acute respiratory failure	234	8/234 (3.4)	4/108 (3.7)	4/126 (3.2)	>0.9‡
Gastrointestinal tract	234	9/234 (3.8)	7/108 (6.5)	2/126 (1.6)	0.085‡
Peripheral nervous system	234	33/234 (14)	15/108 (14)	18/126 (14)	>0.9†
Central nervous system	234	18/234 (7.7)	14/108 (13)	4/126 (3.2)	0.005†
Cardiac	234	9/234 (3.8)	6/108 (5.6)	3/126 (2.4)	0.3‡
Kidney	234	164/234 (70)	68/108 (63)	96/126 (76)	0.028†
Laboratory features					
Creatinine	234	134 (71–303)	114 (65–291)	178 (80–318)	0.065§
Creatinine≥300 µmol/L	234	59/234 (25)	24/108 (22)	35/126 (28)	0.3†
Creatinine≥500 µmol/L	234	23/234 (9.8)	12/108 (11)	11/126 (8.7)	0.5†
Induction therapy					
High-dose methylprednisolone	234	169/234 (72)	76/108 (70)	93/126 (74)	0.6†
CYC (induction)¶	234	70/234 (30)	30/108 (28)	40/126 (32)	0.5†
RTX (induction)¶	234	174/234 (74)	84/108 (78)	90/126 (71)	0.3†
Plasma exchange	233	40/233 (17)	27/108 (25)	13/125 (10)	0.003†
Dialysis	234	20/234 (8.5)	12/108 (11)	8/126 (6.3)	0.2†
Remission achievement	233	227/233 (97)	106/108 (98)	121/125 (97)	0.7*
Maintenance therapy					
Rituximab	226	208/226 (92)	101/105 (96)	107/121 (88)	0.032†
Cumulative dose of GC (gram)					
After 6 months	211	3225 (2460–4646)	4646 (3966–5381)	2520 (2235–2895)	<0.001†
After 12 months	196	4474 (3270–6015)	5835 (4973–6926)	3360 (3135–3943)	<0.001†

寛解導入療法

CY 30%前後
RTX 75%前後

PEXはstandGC regimen群で有意に多い

主要評価項目

Table 2 Primary and secondary outcomes at 12 months (N=234)

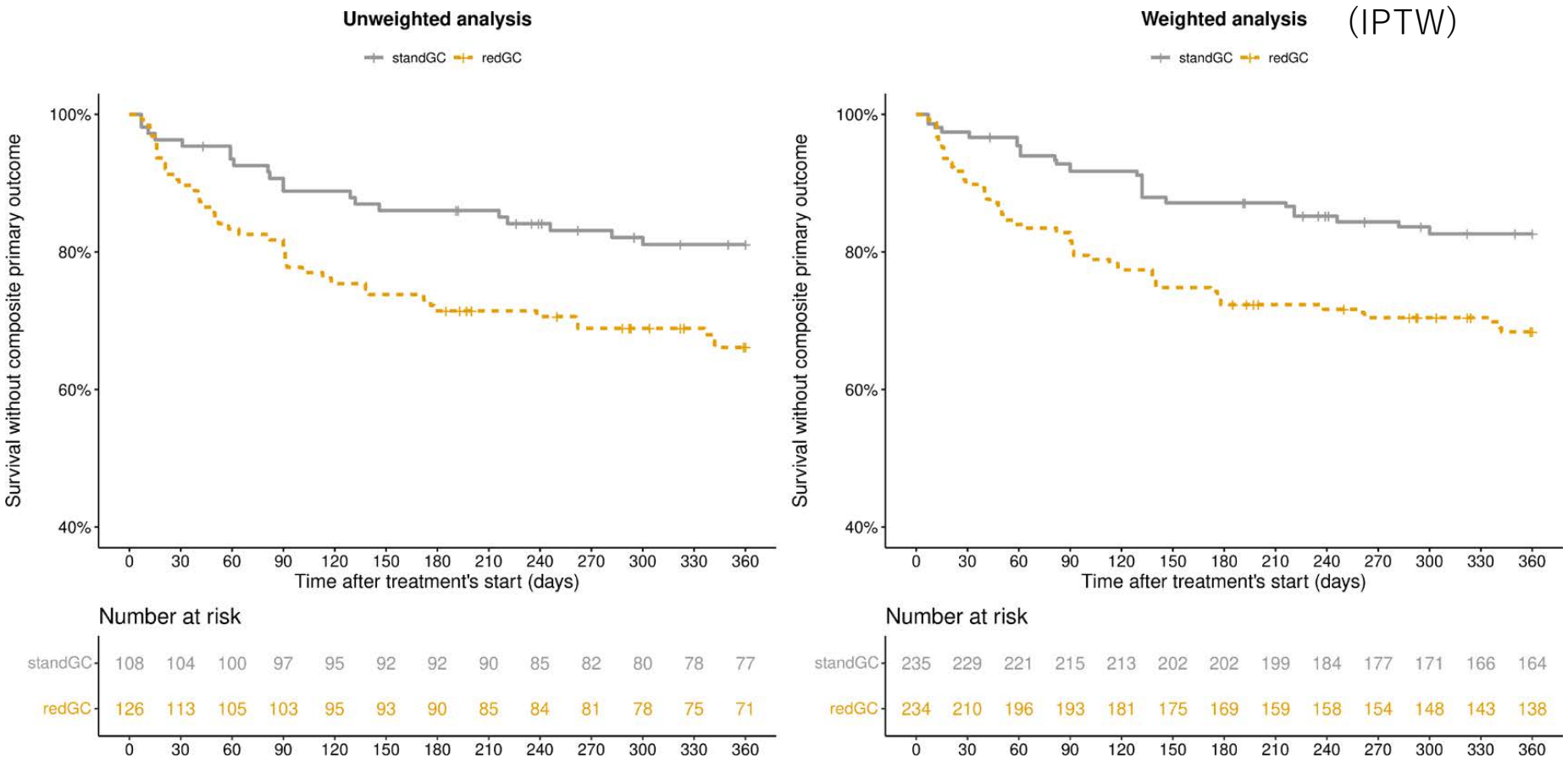
Characteristic	N	Overall, N=234*	Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126	P value
Composite primary outcome	234	62/234 (26.5)	20/108 (18.5)	42/126 (33.3)	0.010†
Outcome contributing to the primary outcome	*62*				*0.2†*
Progression before achieving remission		*23/62 (37)*	*6/20 (30)*	*17/42 (40)*	
Minor relapse		*11/62 (18)*	*4/20 (20)*	*7/42 (17)*	
Major relapse		*5/62 (8.1)*	*4/20 (20)*	*1/42 (2.4)*	
ESKD		*12/62 (19)*	*4/20 (20)*	*8/42 (19)*	
Death		*11/62 (18)*	*2/20 (10)*	*9/42 (21)*	

Outcome	Analysis	Treatment group, %		HR (95% CI)	P value
		Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126		
Composite primary outcome	Unweighted	18.5	33.3	**1.99 (1.17 to 3.38)**	**0.012**
	Adjusted*	NA	NA	**2.20 (1.23 to 3.94)**	**0.008**
	Weighted	19.9	31.1	**2.03 (1.08 to 3.83)**	**0.028**

*Covariates in the adjusted analysis were age, ANCA-associated vasculitis type (MPA), relapsing disease, serum creatinine, high-dose methylprednisolone use, rituximab induction, plasma exchanges, pulmonary nodules.

- **Composite primary outcome**
  - StandGC regimen 18.5%
  - RedGC regimen 33.3%

共変数による調整後も、redGCは主要評価項目の発生と有意に関連


Unweighted analysis
standGC
redGC
Survival without composite primary outcome
100%
80%
60%
40%
0 30 60 90 120 150 180 210 240 270 300 330 360
Time after treatment's start (days)
Number at risk
standGC 108 104 100 97 95 92 92 90 85 82 80 78 77
redGC 126 113 105 103 95 93 90 85 84 81 78 75 71
0 30 60 90 120 150 180 210 240 270 300 330 360
Weighted analysis (IPTW)
standGC
redGC
Survival without composite primary outcome
100%
80%
60%
40%
0 30 60 90 120 150 180 210 240 270 300 330 360
Time after treatment's start (days)
Number at risk
standGC 235 229 221 215 213 202 202 199 184 177 171 166 164
redGC 234 210 196 193 181 175 169 159 158 154 148 143 138
0 30 60 90 120 150 180 210 240 270 300 330 360

副次評価項目

Table 2 Primary and secondary outcomes at 12 months (N=234)

Characteristic	N	Overall, N=234*	Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126	P value
Progression before achieving remission	234	25/234 (11)	8/108 (7.4)	17/126 (13)	0.2†
Minor relapse	234	14/234 (6.0)	4/108 (3.7)	10/126 (7.9)	0.2†
Major relapse	234	6/234 (2.6)	5/108 (4.6)	1/126 (0.8)	0.10†
Death or ESKD	234	27/234 (12)	8/108 (7.4)	19/126 (15)	0.067†
Death	234	14/234 (6.0)	4/108 (3.7)	10/126 (7.9)	0.2†
ESKD	234	15/234 (6.4)	5/108 (4.6)	10/126 (7.9)	0.3†
Remission	228	221/228 (97)	103/105 (98)	118/123 (96)	0.5†
Severe infections	234	43/234 (18)	17/108 (16)	26/126 (21)	0.427†

Outcome	Analysis	Treatment group, %		HR (95% CI)	P value
		Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126		
Death or ESKD	Unweighted	7.4	15	2.09 (0.92 to 4.78)	0.08
	Adjusted*	NA	NA	2.28 (0.92 to 5.64)	0.08
	Weighted	7.8	11.4	1.73 (0.70 to 4.24)	0.2
Progression before achieving remission	Unweighted	7.4	13	1.69 (0.75 to 3.79)	0.203
	Adjusted*	NA	NA	2.16 (0.94 to 4.92)	0.068
	Weighted	7.4	13.2	2.18 (0.90 to 5.28)	0.086
Minor or major relapse	Unweighted	7.4	8.7	1.26 (0.51 to 3.13)	0.621
	Adjusted*	NA	NA	1.47 (0.57 to 3.80)	0.428
	Weighted	9.8	9.3	1.17 (0.39 to 3.46)	0.8
Remission†	Unweighted	98	96	1.04 (0.80 to 1.36)	0.748
	Adjusted*	NA	NA	0.97 (0.72 to 1.30)	0.692
	Weighted	96.8	114	1.01 (0.75 to 1.37)	>0.9

Table 2 Primary and secondary outcomes at 12 months (N=234)

Characteristic	N	Overall, N=234*	Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126	P value
Progression before achieving remission	234	25/234 (11)	8/108 (7.4)	17/126 (13)	0.2†
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Major relapse	234	6/234 (2.6)	5/108 (4.6)	1/126 (0.8)	0.10†
Death or ESKD	234	27/234 (12)	8/108 (7.4)	19/126 (15)	0.067†
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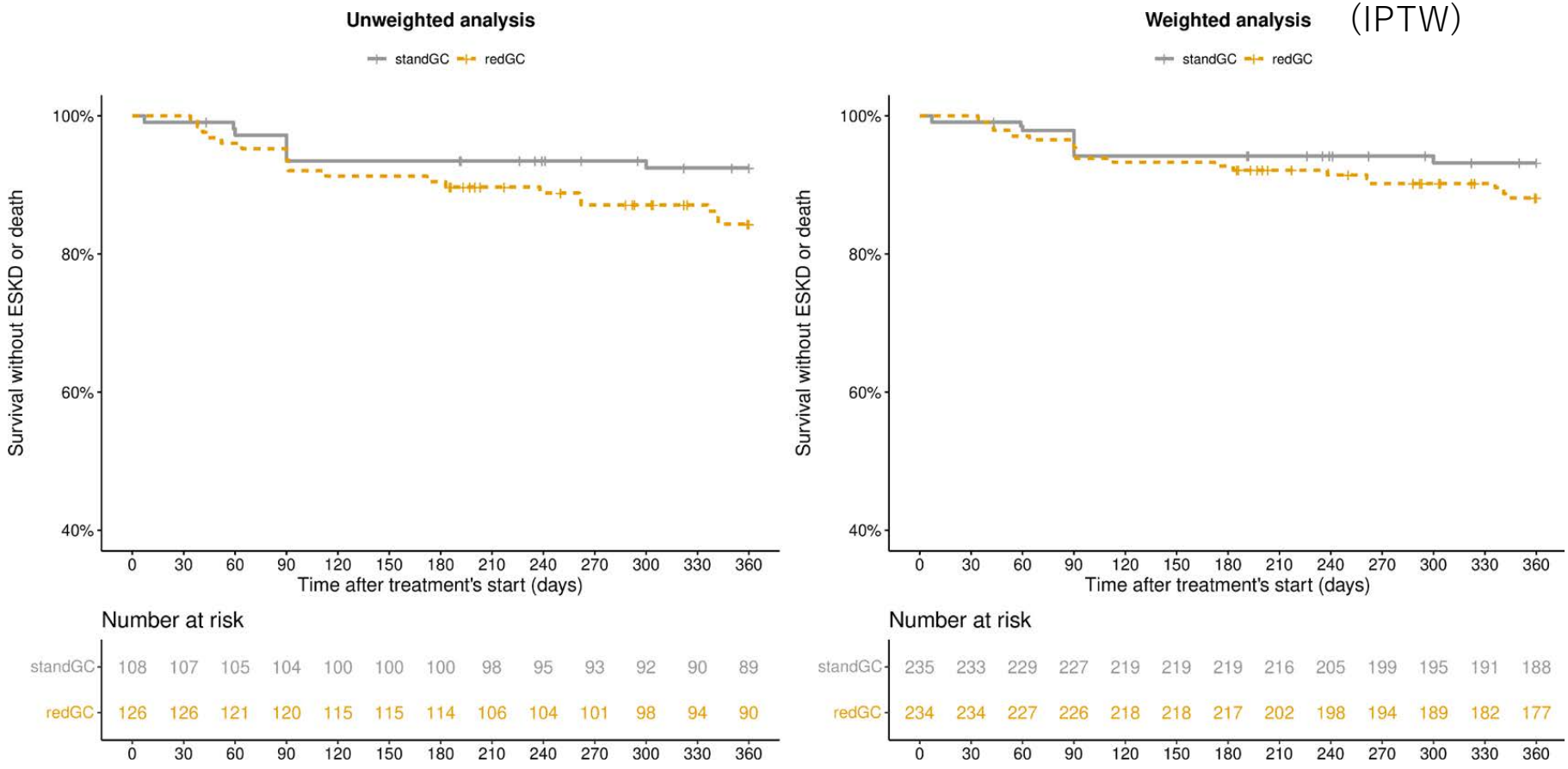
Remission	228	221/228 (97)	103/105 (98)	118/123 (96)	0.5†
Severe infections	234	47/234 (18)	21/108 (19)	26/126 (21)	0.427†

いずれも有意差なし

Outcome	Analysis	Treatment group, % Standard-dose GC regimen N=108	Reduced-dose GC regimen N=126	HR (95% CI)	P value
Death or ESKD	Unweighted	7.4	15	2.09 (0.92 to 4.78)	0.08
	Adjusted*	NA	NA	2.28 (0.92 to 5.64)	0.08
	Weighted	7.8	11.4	1.73 (0.70 to 4.24)	0.2
Progression before achieving remission	Unweighted	7.4	13	1.69 (0.75 to 3.79)	0.203
	Adjusted*	NA	NA	2.16 (0.94 to 4.92)	0.068
	Weighted	7.4	13.2	2.18 (0.90 to 5.28)	0.086
Minor or major relapse	Unweighted	7.4	8.7	1.26 (0.51 to 3.13)	0.621
	Adjusted*	NA	NA	1.47 (0.57 to 3.80)	0.428
	Weighted	9.8	9.3	1.17 (0.39 to 3.46)	0.8
Remission†	Unweighted	98	96	1.04 (0.80 to 1.36)	0.748
	Adjusted*	NA	NA	0.97 (0.72 to 1.30)	0.692
	Weighted	96.8	114	1.01 (0.75 to 1.37)	>0.9


Unweighted analysis
standGC
redGC
100%
80%
60%
40%
Survival without ESKD or death
0 30 60 90 120 150 180 210 240 270 300 330 360
Time after treatment's start (days)
Number at risk
standGC 108 107 105 104 100 100 100 98 95 93 92 90 89
redGC 126 126 121 120 115 115 114 106 104 101 98 94 90
0 30 60 90 120 150 180 210 240 270 300 330 360
Weighted analysis (IPTW)
standGC
redGC
100%
80%
60%
40%
Survival without ESKD or death
0 30 60 90 120 150 180 210 240 270 300 330 360
Time after treatment's start (days)
Number at risk
standGC 235 233 229 227 219 219 219 216 205 199 195 191 188
redGC 234 234 227 226 218 218 217 202 198 194 189 182 177
0 30 60 90 120 150 180 210 240 270 300 330 360

サブグループ解析

RedGC群のサブグループ

	HR, univariate (95%CI)	HR, multivariate (95%CI)
Gender = Female	0.88 (0.48-1.62)	-
Age	1.00 (0.98-1.02)	-
MPA	0.68 (0.37-1.25)	-
Relapsing disease	0.89 (0.45-1.78)	-
Cutaneous involvement	1.08 (0.50-2.33)	-
Cutaneous necrosis	**9.23 (2.14-39.83)**	-
Gastrointestinal involvement	**11.29 (2.61-48.89)**	-
Kidney injury	1.09 (0.53-2.21)	-
Serum creatinine (by 10 µmol/L)	**1.02 (1.01-1.03)**	-
Serum creatinine >300 µmol/L	**3.42 (1.51-7.77)**	**3.02 (1.28-7.11)**
High dose methylprednisolone	1.61 (0.74-3.47)	-
Cyclophosphamide induction	1.54 (0.83-2.85)	-
Rituximab induction	0.60 (0.32-1.13)	0.72 (0.37-1.38)
Plasma exchange	0.99 (0.35-2.76)	-

血清Cr>3.39 mg/dLで主要評価項目発生率が高くなった
(aHR 3.02, 95%CI 1.28 to 7.11)

寛解導入でRTXを使用したサブグループ

主要評価項目

	HR, univariate (95%CI)	HR, multivariate (95%CI)
Reduced-dose GC regimen	**2.22 (1.12-4.40)**	**2.36 (1.18-4.71)**
Age	0.99 (0.98-1.01)	0.99 (0.98-1.01)
MPA	0.60 (0.30-1.22)	-
Relapsing disease	1.61 (0.84-3.09)	-
Serum creatinine >300 μmol/L	1.39 (0.43-4.52)	1.71 (0.51-5.72)
High dose methylprednisolone	1.70 (0.80-3.59)	-
Plasma exchange	0.78 (0.28-2.19)	-

RedGC群で主要評価項目の発生が多かった

死亡もしくはESKD

	HR, univariate (95%CI)	HR, multivariate (95%CI)
Reduced-dose GC regimen	2.63 (0.84-8.25)	**3.45 (1.07-11.17)**
Age	**1.04 (1.00-1.08)**	-
MPA	**2.46 (0.88-6.92)**	-
Relapsing disease	1.21 (0.41-3.54)	-
Serum creatinine >300 μmol/L	**6.82 (2.16-21.49)**	**9.26 (2.84-30.17)**
High dose methylprednisolone	7.26 (0.95-55.25)	-
Plasma exchange	0.45 (0.06-3.42)	-

RedGC群、Cr>3.39mg/dL群で死亡もしくはESKDの発生が多かった

Discussion

- 主要評価項目がredGC群で多く発生した理由は、主に寛解達成前の悪化によるものであり、免疫抑制薬の追加や大幅なGC増量につながった可能性が高い。

- 一方、PEXIVASと同様に、本研究でもredGCと死亡またはESKD(PEXIVASでの主要評価項目)との関連は見られなかった。

- 以下のサブグループでは、redGCを使用する際に注意を要する。
  1. RTXを寛解導入で使用
  2. Cr≧3.39 mg/dL

本研究とPEXIVASの結果が一致しなかった理由

1. 患者集団の違い

- PEXIVAS：eGFR<50の重症腎障害や肺胞出血を呈する患者
- 本研究：約25%が腎障害や肺胞出血を伴わず、PEXIVASに比べると1年後の死亡またはESKDの割合が低い

2. 寛解導入療法の違い

PEXIVASではRTXの投与は全体の15%であった

3. 寛解維持療法の違い

PEXIVASではAZA、本研究では89%でRTX

4. 血漿交換使用の割合の違い

Limitation

1. 後ろ向き研究であること
2. 群間の患者背景にいくつか違いがあったこと
3. 約25%の患者でステロイドパルスが投与されていなかったこと
4. StandGC群のGCレジメンに不均一性があり、追跡期間が短め
5. 感染リスクが高そうな患者ではredGCレジメンが選択された可能性があること
6. 腎病理データの欠如
7. サブグループ解析では統計的パワーが不足していた可能性