Appendix S1.

SUPPLEMENTARY METHOD

Data analysis

For the RCT and comparative studies, we produced a pooled estimate of complete remission (CR) and relapse rates for patients treated with high-dose compared with low-dose RTX. Results were expressed as overall odds ratio (OR) with associated 95% confidence intervals (95% CI). Homogeneity testing was performed using the I^2 test. A fixed-effect model employing Mantel-Haenszel methods was used. For studies in which heterogeneity was identified ($I^2 > 60\%$, $p < 0.05$), a random effects model was employed. Analysis was performed using Review Manager (Version 5.2, Nordic Cochrane Center, Copenhagen, Denmark).

For studies that provided with patient raw data (detailed information for each patient), data were combined to obtain mean values for patient age, disease duration, time to disease control and CR, remission duration, and follow-up time. We also evaluated the rates of genders, pemphigus types, disease severity, concomitant medication-use, partial and CR, relapse and major adverse events. We then performed statistical analysis to compare the clinical characteristics and outcomes among: (*i*) high-dose group and low-dose group; (*ii*) RA protocol group and lymphoma protocol groups. Means were compared using 1-way analysis of variance. Categorical data were assessed using the χ^2 test. Multivariate logistic regression and linear regression models were employed for adjustment. Values of $p < 0.05$ were considered statistically significant. Statistical analysis was performed using PASW Statistics 18.0.

SUPPLEMENTARY RESULTS

Univariate analysis showed a significantly higher proportion of patients with severe disease severity in the high-dose group than the low-dose group (53.4% vs. 20.8%; $p = 0.004$). Patients in the high-dose group achieved disease control more rapidly (5.35 vs. 6.99 weeks; $p = 0.01$) and sustained a longer duration of CR (16.67 vs. 9.11 months; $p = 0.006$) with longer follow-up time (31.15 vs. 17.34 months; $p = 0.001$), compared with patients in the low-dose group. There were no significant differences between the 2 groups regarding the means or rates of age, sex, type of pemphigus, disease duration, concomitant medication use, TCRon, CR, relapse and adverse effects.

Significantly higher proportions of patients in the lymphoma protocol group presented with severe disease severity (61% vs. 33.3%; $p = 0.01$) and were treated concomitantly with steroids or ISA (55.4% vs. 26%; $p = 0.001$), compared with those in the RA protocol group. Patients in the lymphoma protocol group reached disease control more rapidly than patients in the RA protocol group (5.16 vs. 6.68 weeks; $p = 0.04$). The remission duration (18.85 vs. 7.96 months; $p = 0.001$) and follow-up time (37.66 vs. 17.3 months; $p = 0.002$) were significantly longer in the lymphoma protocol group than in the RA protocol group.

Multivariate logistic regression and linear regression analyses were also performed in the subgroup of patients treated with lymphoma and RA protocol, adjusting for the aforementioned variables and concomitant medication use. There was only a trend towards higher CR (lymphoma vs. RA protocols; OR 1.11; 95% CI: 0.32–3.77), shorter TDC (β coefficient, –0.68; 95% CI: –2.22–0.89), shorter TCRon (β coefficient, –0.05; 95% CI: –0.47–0.38) and longer remission duration (β coefficient, 1.91; 95% CI: –2.19–5.01) using lymphoma protocol. Concomitant use of steroids and ISA was significantly associated with CR (OR 0.67; 95% CI: 0.25–0.84). Longer follow-up time was also significantly correlated with higher relapse rate (OR 1.22; 95% CI: 1.06–1.40).

Table SI. *Summary of included studies*

Study (ref), year	Study period	Study design	Sample size and classification	Rituximab treatment	Concomitant therapy	Author's conclusion
Arin et al. (4), 2005	N/A	Case series	4 PF, 1 PV	375 mg/m²qwk ×4	CS+ISA (5)	Effective
Goh et al. (7), 2007	N/A	Prospective case series	5 PV	375 mg/m²qwk ×4	CS only (1), CS+ISA (4)	Effective; caution with multiple concomitant ISA
Marzano et al. (8), 2007	2004–07	Case series	2 PV, 3 PF	375 mg/m²qwk ×4	CS+ISA (5)	Effective
Antonucci et al. (5), 2007	N/A	Case series	5 PV	375 mg/m²qwk ×4	CS (5), ISA (N/A)	Effective
Cianchini et al. (6), 2007	N/A	Case series	10 PV, 2 PF	375 mg/m²qwk ×4	CS only (1), CS+ISA (11)	Effective
Shimanovich, et al. (25), 2008	2005–07	Case series	5 PV, 2 PF	375 mg/m²qwk ×4+ PAIA	CS only (1), CS+ISA (11)	Effective with rapid remission
Schmidt et al. (9), 2009	N/A	Case series	8 PV, 3PF	375 mg/m²qwk ×4 (*n*=3) 375 mg/m²qwk ×4+ IA (*n*=8)	CS+ISA (11)	Effective
Kim et al. (11), 2011	1993–08	Case series/cohort study	15 PV, 1 PF	375 mg/m² q2–3 wk ×4	CS+ISA (16)	Effective with earlier remission than those with conventional therapy (CR 3.8 vs. 72 months; *p*=0.001)
Kasperkiewiczet al. (10), 2011	N/A	Case series	8 PV, 2 PF	375 mg/m²qwk ×4 (*n*=4; 2 with concomitant IA) 1,000 mg q2wk ×2 (*n*=5; 1 with concomitant IA) 500 mg q2wk ×2 (*n*=1)	CS+ISA (9) ISA only (1)	Effective
Kim et al. (22), 2011	2006–10	Comparative study	25 PV, 2 PF	375 mg/m²qwk ×2 (*n*=12) 375 mg/m²qwk ×3 (*n*=12) 375 mg/m²qwk ×4 (*n*=1) 375 mg/m²qwk ×5 (*n*=2)	CS (3) CS+ISA (24)	Effective at different doses but ≥3 infusions with shorter time to CR and lower relapse rate
Kasperkiewiczet al. (28), 2012	N/A	Case series	17 PV, 6 PF	1,000 mg q3wk ×2+ PAIA	Pulsed dexamethasone plus AZA or MMF	Effective with fast and long-term remission
Horváth et al. (23), 2012	2008–11	Case series	12 PV, 3 PF	500 mg q2wk ×2	CS+ISA (7), ISA only (4), CS only (2), Nil (2)	Effective
Behzad et al. (26), 2012	N/A	Case series	10 PV	IA+1,000 mg q2wk ×2 (*n*=8) IA+375 mg/m²qwk ×4 (*n*=2)	CS+ISA (6) ISA only (2), CS only (2)	Effective
Reguiai et al. (13), 2012	1997–10	Comparative study	9 PV, 4 PF (RTX); 7 PV, 4 PF (control)	375 mg/m²qwk ×4 (*n*=13) Control subjects (*n*=11; with CS±ISA)	CS+ISA (6) ISA only (3), Nil (4)	Effective; long-term CR without maintenance therapy did not differ significantly from that of control subjects
Kasperkiewicz et al. (27), 2012	~2008	Case series	33 PV, 3 PF	375 mg/m²qwk ×4 (*n*=10) 1,000 mg q2–3wk ×2 (*n*=25) 375 mg/m² ×7 with irregular intervals (*n*=1) Concomitant IA (*n*=14)	N/A	Effective
Cianchini et al. (18), 2012	N/A	Case series	37 PV, 5 PF	1,000 mg q15d ×2	Low-dose CS only (42)	Effective
Lunardon et al. (12), 2012	2005–12	Case series	24 PV, 7 PF	375 mg/m²qwk ×4 (*n*=15) 1,000 mg q2wk ×2 (*n*=16)	CS+ISA (20) ISA only (3), CS only (8)	Effective (median disease-free remission of 19 months); better outcomes with early RTX use
Colliou et al. (35), 2013[a]	2003–04; 2003–10	Prospective multicenter series	14 PV, 7 PF	375 mg/m²qwk ×4	CS only (16), Nil (5)	Effective
Leshem et al. (19), 2013	2007–11	Case series	42 PV, 3 PF	1,000 mg q2wk ×2 (*n*=45)	N/A	Effective
Baum et al. (15), 2013	2009–12	Case series	18 PV	375 mg/m²qwk ×4 (*n*=18)	CS+ISA (10), CS only (8)	Effective
Kanwar et al. (24), 2013	N/A	Case series	8 PV, 1 PF	1,000 mg q2wk ×2 (*n*=9)	CS+ISA (1), CS only (8)	Effective
Kolesnik et al. (29), 2014	2007–12	Case series	6 PV, 2 PF	PAIA+375 mg/m²qwk ×3 (*n*=1); ×4 (*n*=6); ×5 (*n*=1)	CS+ISA (6), CS only (2)	Effective
Balighi et al. (14), 2013	2007–11	Case series	40 PV	375 mg/m²qwk ×4 (*n*=40)	CS only (40)	Effective as adjuvant therapy; safety concern

Table SI. *Contd.*

Cho et al. (31), 2013	2009–11	Case series	6 PV, 3 PF	500 mg qwk ×4 (n=9)	CS only (9)	Effective
Heelan et al. (20), 2014	2006–13	Case series	84 PV, 8 PF	1,000 mg q2wk ×2 (n=92)	CS+ISA (15), CS or ISA only (76), Nil (1)	Effective; further cycles of RTX after relapses were still efficacious.
Cho et al. (16), 2013	2006–11	Comparative study	17 PV, 6PF	375 mg/m^{2}qwk ×4 (n=8) 375 mg/m^{2}qwk ×3 (n=2) 375 mg/m^{2}qwk ×2 (n=13)	CS+ISA (16) CS only (7)	Effective
Kanwar et al. (21), 2014	2011–12	Randomized comparative study	15 PV, 7 PF	1,000 mg q2wk ×2 (n=11) 500 mg q2wk ×2 (n=11)	CS only (21)	Effective; higher dose group showed lower relapse rate and lesser amount of adjuvant drug
Gregoriou et al. (17), 2014	2008–12	Case series	17 PV, 1 PF	375 mg/m^{2}qwk ×4 (n=18)	CS+ISA (4), CS only (8), ISA only (6)	Effective
Leshem et al. (36), 2014[b]	2010–13	Case series	10 PV	1,000 mg q2wk ×2 (n=10)	CS+ISA (1), CS only (9)	Effective

[a]The study included is the long-term follow-up study from Joly et al. (41), 2007. [b]All cases in this series were from the published data in Leshem et al. (19), 2013. This 9-case series was excluded in overall analysis, but included in multivariate analysis due to availability of raw data.

PAIA: protein A immunoadsorption; AZA: azathioprine; MMF: mycophenolate mofetil; RTX: rituximab; PV: pemphigus vulgaris; PF: pemphigus foliaceus; CS: corticosteroid; ISA: immunosuppressive agent; IA: immunoadsorption; CR: complete remission; N/A: no data available; Nil: no concomitant drug; qwk: every week; q2w: in 2-week intervals.

Table SII. *Details of included studies*

Study (year)	Definition of endpoints[a]	Scoring system for disease severity[b]
Arin et al. (4), 2005	CR: healing of mucocutaneous lesions for >2 months within 12 months after RTX PR: >50% healing; MR: <50% healing	Disease activity score as PSS (42) with slight modifications
Goh et al. (7), 2007	CR: absence of clinical disease without further treatment CRm: absence of clinical disease on medication PD: any increase in medication or extent of skin involvement	Disease severity score adapted from PSS (42)
Marzano et al. (8), 2007	CR: absence of new lesions with complete healing of old lesions for a minimum of 8 weeks regardless of the treatment used PR and MR: healing of the mucocutaneous lesions by at least 50% and less than 50%, respectively, of the body area initially involved, with the possible presence of ≤5 new lesions lasting >1 week	Disease activity score as PSS (42) with slight modifications
Antonucci et al. (5), 2007	CR: absence of new lesions with complete healing of previous lesions with or without further treatment	BSA
Cianchini et al. (6), 2007	CR: absence of lesions for at least 1 month and no treatment with CS or adjuvants or treatment with ≤5 mg of prednisone per day Long-lasting CR: no treatment with CS or adjuvant therapies for 6 months and being free of lesions PR: presence of 1–5 new oral or cutaneous blisters per week with treatment with ≤10 mg prednisone and no adjuvants Disease control: suppression of new blisters, together with the beginning of healing of the existing lesions and the Nikolsky phenomenon potentially present	Ikeda severity score (ISS) (43)
Shimanovich et al. (25), 2008	[**AQ6]** PAIA: D1–3 and then D8, 15, 22, 29 along with RTX; maintenance PAIA was stopped if healing of 80% of pre-existing lesions without fresh lesions for 1 week CR: clinical and serological remission off treatment CliR (clinical remission): healing of all lesions on further therapy PR: healing of >80% of lesions.	Disease activity (0–4); 3–4 as baseline clinical status.
Schmidt et al. (9), 2009	CR (score 0): complete remission and immunosuppression omitted CliR (score1): clinical remission without lesions but immunosuppression required PR: improvement of the scores Relapse: back to baseline (score 3–4) Concomitant IA protocol: not specified	Disease activity (0–4); 3–4 as baseline clinical status.
Kim et al. (11), 2011	Consensus (34)	PSS (42) with modified definitions for mild, moderate and severe (PV: 0–4, 5–8 and 9–13; PF: 0–3, 4–7 and 8–11)
Kasperkiewicz et al. (10), 2011	Consensus (34) PAIA: on days 1, 2, 3 (first treatment cycle), 21, 22 and 23 (second treatment cycle), along with RTX on days 4 and 24 (1 treatment cycle). Three-day IA treatment cycles were repeated initially every 3 and then 4 weeks until skin lesions had healed by 90%	N/A
Kim et al. (22), 2011	Consensus (34)	PSS (42) with slight modifications
Kasperkiewicz et al. (28), 2012	Consensus (34)	N/A
Horváth et al. (23), 2012	Consensus (34)	N/A
Behzad et al. (26), 2012	Consensus (34) IA: The first cycle of IA was given within 1–6 months prior to the first administration of RTX. During a single treatment cycle, IA was administered on 4 consecutive days (2A5-fold plasma volume on each day), followed by a second IA cycle 4 weeks later. The optional third and fourth treatment IA cycles were also performed 4 weeks after the previous one	Autoimmune Bullous Skin Disorder Intensity Score (ABSIS) (44)
Reguiai et al. (13), 2012	Consensus (34)	N/A
Kasperkiewicz et al. (27), 2012	Consensus (34)	BSA and well-being (visual analogue scale)
Cianchini et al. (18), 2012	Consensus (34)	ISS (43)
Lunardon et al. (12), 2012	Consensus (34) plus CI (CR) defined as clinical improvement (complete remission on doses greater than minimal therapy) and CI (PR) defined as clinical improvement (partial remission on doses greater than minimal therapy)	N/A

Table SII. *Contd.*

Colliou et al. (35), 2013	Consensus (34)	BSA
Leshem et al. (19), 2013	Consensus (34)	N/A
Baum et al. (15), 2013	Consensus (34) but whether patients were on or off all systemic therapy at remission were not specified.	N/A
Kanwar et al. (24), 2013	Consensus (34)	ISS (43)
Kolesnik et al. (29), 2014	CR: according to consensus (34) PR: defined as presence of single small lesions Magdeburg treatment protocol: induction consisted of 3 initial PAIA on 3 consecutive days, followed by the first RTX infusion at day 4. Post-induction phase comprised single PAIA in weekly and later bi-weekly intervals latest up to week 31, coupled to a total of 4–6 single RTX administrations on the subsequent day. The cohort of 15 patients with autoimmune skin blistering diseases was treated with a mean of 9.3 PAIA and 4.2 RTX infusions (375 mg/m^2 each)	ABSIS (44)
Balighi et al. (14), 2013	Initial clinical improvement (CI): defined as the time from the first RTX infusion to cessation of new blister formation, negative Nikolsky sign and re-epithelialization of the earlier lesions Marked CI: no new blister formation, negative Nikolsky sign and near complete re-epithelialization of the lesions parallel to prednisolone dose reduction Relapse: clinical disease progression (new blister or positive Nikolsky sign) and an inevitable increase in the dose of prednisolone for disease control after a CI. (Minor relapse was defined as <10 cutaneous or 5 mucosal lesions, with more numerous lesions characterizing major relapse.)	N/A
Cho et al. (31), 2013	Consensus (34)	PSS (42)
Heelan et al. (20), 2014	Consensus (34)	N/A
Cho et al. (16), 2013	Consensus (34)	PSS (42)
Kanwar et al. (21), 2014	Consensus (34)	ISS (43) and Saraswat's modified oral pemphigus score (SMOPS) as mild (<5), moderate (5–7) and severe (>7).
Gregoriou et al. (17), 2014	Consensus (34)	Revised ISS (43)
Leshem et al. (36), 2014	Consensus (34)	Pemphigus Disease Area Index (PDAI)

[a]Consensus (34) as following: "CR off therapy" was defined as the absence of new or established lesions, as well as the healing of all skin and mucosal lesions with complete epithelialization when patients were off all systemic therapy for at least 2 months.
"CR on minimal therapy" was defined as the absence of new or established lesions while patients were still receiving minimal therapy (prednisone less than or equal to 10 mg/day) and/or minimal adjuvant therapy for at least 2 months.
"PR off therapy" was defined as presence of transient new lesions that heal within 1 week without treatment and while the patient is off all systemic therapy for at least 2 months.
"PR on therapy" was presence of transient new lesions that heal within 1 week while the patient is receiving minimal therapy, including topical steroids.
"Incomplete remission" was defined as patients still receiving prednisone doses higher than 10 mg/day at the end of the study, even if they had no skin or mucosal lesions at the time of examination.
"Relapse" was defined as the occurrence of >3 new lesions/month that do not heal spontaneously within 1 week, or by the extension of established lesions after having achieved disease control.
"Treatment failure" was defined as the inability to control disease activity with full therapeutic doses of systemic treatments.
"Minimal therapy" was defined as: (i) prednisolone in a dosage of less than 10 mg daily for at least the last 2 months; and/or (ii) "steroid sparing agents" at half of the regular dosage.
[b]PSS was graded as mild, moderate, or severe based on a severity score of ≤2, 3–6, or ≥7, respectively. (42) ISS was classified as mild (<5), moderate (5–7), or severe (>7). BSA, ABSIS and PDAI were classified as mild (<10), moderate (10–30), or severe (>30) based on authors' clinical experience and previous literature (34, 40, 45).
PAIA: protein A immunoadsorption; RTX: rituximab; CR: complete remission; PR: partial remission; MR: minimal remission; IA: immunoadsorption; N/A: no use of scoring system; PSS: pemphigus severity score; BSA: body surface area.

Table SIII. *Summary of clinical and therapeutic data of pemphigus patients from included studies and divided into high dose protocol, low dose protocol, and plus IA protocol*

Study	Mean age (years)	Disease duration (years)	TDC (week)[a]	TCRon (months)[a]	CR (%)[b]	Remission duration of CR (months)	Relapse, *n* (%)	Major adverse event (%)	Mean follow-up time (months)
High-dose group									
Lymphoma protocol (total 2,595 mg by standardized body surface area of 1.73 m^2)									
Arinet al. (4), 2005	47.4 ± 19.4	6.8 ± 4.6	N/A	5.3	3/5 (60)	20.7	2/5 (40)	0	19.6
Goh et al. (7), 2007	54 ± 6.7	3.4 ± 2.9	N/A	5.6	3/5 (60)	10.7	0	2/5 (40), opportunistic infection	16.8
Marzano et al. (8), 2007	43.6 ± 7.6	5.2 ± 1.5	6.4	3	4/5(80)	8.9	1/5 (20)	0	16.4
Antonucci et al. (5), 2007	30.6 ± 2.7	4.8 ± 1.6	4.4	3	5/5 (100)	9	1/5 (20)	0	12
Cianchini et al. (6), 2007	42.3 ± 10.2	3.9 ± 3.7	4	4	9/12 (75)	6.9	0	0	10.5
Schmidt et al. (9), 2009	52.4	N/A	N/A	6	2/3 (66.7)	9	1/3 (33.3)	0	15
Kim et al. (11), 2011	N/A	N/A	2.5	3.8	9/16 (56.3)	N/A	5/16 (31.3)	0	36
Kasperkiewicz et al. (10), 2011	47.5	3.5	N/A	3	1/2 (50)	56	1/2 (50)	0	25.4
Reguiai et al. (13), 2012	40 ± 18.9	6.9 ± 6.6	N/A	6	13/13 (100)	23.9	7/13 (53.8)	0	45.6
Lunardon et al. (12), 2012	44.9 ± 11.3	7.58 ± 6.3	N/A	N/A	4/15 (26.7)	N/A	2/15 (13.3)	0	40.8
Colliou et al. (35), 2013	53.7 ± 15.6	N/A	N/A	8.4	20/21 (95.3)	31.8	17/21(81)	2/21 (9.5); pyelonephritis and septicaemia	74
Baum et al. (15), 2013	50.9 ± 11.6	7.4 ± 6.4	N/A	5.3	13/18 (72.2)	5.3	4/18 (22.2)	0	16
Balighi et al. (14), 2013	40.5	2.9	2.4	9.1	40/40 (100)	N/A	21/41 (52.5)	4/40 (10%); lung abscess, cavernous sinus thrombosis, sepsis, SJS	12
Cho et al. (31), 2013	54.5 ± 17.1	4.1 ± 3.9	6.2 ± 3.2	4.3 ± 1.2	4/8 (50)	14.5	5/8 (62.5)	0	24.9
Gregoriou et al. (17), 2014	49 ± 16.6	5.1 ± 4.2	5	N/A	18/18 (100)	N/A	7/18 (38.9%)	0	9–48
Total lymphoma data (n=186)	46 (*n*=170)	5.0 (*n*=146)	3.6 (*n*=104)	6.6 (*n*=126)	148/186 (79.6)	18.2 (*n*=75)	74/186 (39.8)	8/186 (4.3)	29.1 (*n*=168)
RA protocol (total 2,000 mg)									
Kasperkiewicz et al. (10), 2011	42.3	1.56	N/A	3	4/4(100)	14	3/4(75)	0	20.5
Cianchini et al. (6), 2012	27–75	4.2	N/A	3	36/42 (86)	N/A	20/42 (47.6)	0	26.5
Lunardon et al. (12), 2012	49.2	3.3 ± 3.1	N/A	N/A	9/16 (56.3)	N/A	2/16 (12.5)	2/31 (12.5); phlegmon and osteomyelitis	23.4
Leshem et al. 19), 2013	52 (18–83)	2.1 (0–13.6)	N/A	4 (1–36)	28/45 (62.2)	N/A	5/45 (11.1)	0	18
Kanwar et al. (24), 2013	36.5 ± 12.5	1.6 ± 1.9	8	N/A	6/9 (66.7)	N/A	N/A	2/9 (22.2) sepsis	8
Heelan et al. 20), 2014	47 (17–77)	2 (0–21.3)	N/A	N/A	74/92 (80)	N/A	56/92 (61)	0	24
Kanwar et al. (21), 2014	33.2	2.1	7.1 ± 3.5	5.9	10/11 (90.9)	5.1	4/11 (36.4)	0	12
Total RA data (*n*=219)	42.9 (*n*=40)	3.3 (*n*=82)	7.2 (*n*=19)	3.8 (*n*=50)	167/219 (76.3)	7.6 (*n*=14)	90/219 (42.9)	4/219 (1.8)	21.8 (*n*=219)
Others (total near or ≥2,000 mg)[c]									
Kim et al. (22), 2011	47.7 ± 14.3	1.7	4 (1–10)	5.0 (2.1–13.2)	11/15 (73)	N/A	0	0	18
Kasperkiewicz et al. (27), 2012	52	N/A	N/A	N/A	4/22 (18.2)	N/A	N/A	N/A	11
Cho et al. (31), 2013	54.1 ± 16.0	0	2.2	3.85	9/9 (100)	6.6	8/9(88.9)	0	20.5
Cho et al. (16), 2013	57	3.1	5.5	3.8	2/2 (100)	24.4	2/2 (100)	0	28.3
Total high-dose data (*n*=453)	46.5 (*n*=258)	4.1 (*n*=254)	3.9 (*n*=149)	5.7 (*n*=185)	354/453 (78.1)	15.8 (*n*=100)	172/422 (40.8)	12/431 (2.8)	23.9 (*n*=435)

Table SIII. *Contd.*

Low-dose group (total <1,500 mg)									
Kasperkiewicz et al. (10), 2011	50	0.33	N/A	3	1/1 (100)	9	0	0	12
Kim et al. (22), 2011	48.4 ± 10.1	3.5 ± 2.1	3 (1–11)	14.4 (3.1–29.2)	5/12 (42)	N/A	8/12 (67)	0	11.5
Horváth et al. (23), 2012	55.1 ± 15.1	6.1 ± 3.2	9.8	11.5	8/15 (53.3)	7.1	6/15 (40)	1/15 (6.7) sepsis	21.3
Cho et al. (16), 2013	51.5 ± 13.2	4.4 ± 3.0	3.9	3.5	9/13 (69.2)	15.3	3/13 (23.1)	0	18
Kanwar et al. (21), 2014	33.5	1.3	7.4 ± 4.5	4.2	11/11 (100)	5.5	7/11 (63.6)	0	12
Total low-dose data (n=52)	48.0 (n=52)	4.1 (52)	6 (n=51)	6.1 (n=29)	34/52 (65.4)	9.1 (n=29)	24/52 (46.2)	1/52 (1.9)	16.6 (n=52)
Rituximab (high dose) plus immunoadsorption protocol									
Shimanovich et al. (25), 2008	56.9 ± 16.9	2.9 ± 2.3	–2[d]	3.75	3/7 (42.9)	16.3	3/7(42.9)	3/7 (42.9); PCP, staphylococcal bacteremia and PE	23.3
Schmidt et al. (9), 2009	52.4	N/A	N/A	5	3/8 (37.5)	10	4/8 (50)	0	15
Kasperkiewicz et al. (10), 2011	53.3	2.7	N/A	3.3	3/3 (100)	9.3	3/3 (100)	0	29
Kasperkiewicz et al. (28), 2012	54.3 ± 12.7	3.0	–1.3[d]	8.2	22/23 (95.7)	17.7	6/23 (26)	2/23 (9); staphylococcal bacteremia and extensive herpes simplex infection	29
Behzad et al. (26), 2012	52.1 ± 9.8	5.4 ± 2.6	N/A	3.3	8/10 (80)	7.3	1/10 (10)	0	10.8
Kasperkiewicz et al. (27), 2012	52	N/A	N/A	N/A	4/14 (29)	N/A	N/A	N/A	11
Kolesnik et al. (29), 2014	59.5 ± 13.3	4.0 ± 6.7	–1[d]	4.7	7/8 (87.5)	20.6	1/8 (12.5)	0	20.5
R+IA total data (n=73)	54.1 (n=73)	3.6 (n=51)	N/A	6.1 (n=46)	50/73 (68.5)	15.2 (n=46)	18/59 (30.5)	5/73 (8.5)	21.1 (n=73)
Overall total data (n=578)	48.2 (n=383)	4.1 (n=357)	4.4 (n=200)	5.8 (n=262)	438/578 (75.8)	14.5 (n=175)	214/533 (40.2)	18/542 (3.3)	22.9 (n=560)

[a]Started from the end of rituximab (RTX) treatment. [b]Complete remission according to the definition of the original study (Table SI). [c]The group classified as "Others" included patients receiving high-dose regimens other than RA or lymphoma protocols and those using high-dose RTX without detailed information in Kasperkiewicz et al. (17), 2012. [d]Onset immediately after starting IA and before completion of the RTX regimen.
Data expressed as mean ± standard deviation (if available) or percentage.
Comparisons by analysis of variance (ANOVA) or χ^2 test.
CR: complete remission; TDC: time to disease control; TCRon: time to complete remission on therapy; IA: immunoadsorption; RA: rheumatoid arthritis; SJS: Stevens–Johnson syndrome; PCP: pneumocytosis carinii pneumonia; PE: pulmonary embolism; N/A: not applicable.

Table SIV. *Linear regression and logistic regression of outcomes*

	Time to disease control	TCRon	Complete remission duration	Complete remission	Relapse
Risk factor	β coefficient (95% CI)	β coefficient (95% CI)	β coefficient (95% CI)	OR (95% CI)	OR (95% CI)
Constant	2.300	4.297	–3.530	7.345	0.601
Age, years	–0.01 (–0.02–0.01)	–0.02 (–0.06–0.01)	0.02 (–0.11–0.15)	1.00 (0.97–1.03)	0.98 (0.95–1.02)
Sex (male)	–0.03(–0.35–0.29)	0.69 (–0.26–1.65)	–0.93 (–5.44–3.58)	0.77 (0.30–1.98)	1.46 (0.59–3.59)
Type (PF vs. PV)	–0.21(–0.61–0.19)	0.71 (–0.49–1.91)	–0.12 (–2.58–2.34)	1.14 (0.34–3.88)	0.55 (0.17–1.71)
Disease severity[a]	0.13(–0.21–0.46)	–0.58 (–1.70–0.53)	–2.61 (–4.89–0.34)	0.99 (0.37–2.65)	0.54 (0.20–1.47)
Disease duration	0.01(–0.04–0.06)	–0.15 (–0.32–0.01)	–0.63 (–1.29–0.01)	0.90 (0.80–0.97)*	0.99 (0.34–2.92)
Protocol (high vs. low)	–0.02(–0.43–0.39)	0.78 (–0.38–1.95)	2.57(1.19–4.95)*	0.99 (0.27–3.54)	0.87 (0.74–1.02)
Follow-up time	Not applicable	Not applicable	0.47 (0.59–0.64)*	Not applicable	1.11 (1.02–1.20)*

[a]Severe vs. mild/moderate.

Full-adjusted model included age, gender, type of pemphigus, disease duration, disease severity, treatment protocols and follow-up time.

Based on the raw data of 213 patients from 17 separate studies (4–10, 12, 13, 16, 17, 21, 23, 24, 31, 35, 36).

Values expressed as odds ratio (OR) (95% confidence interval; 95% CI).

*$p<0.05$ with significant difference.

PV: pemphigus vulgaris; PF: pemphigus foliaceus; TCRon: time to complete remission on therapy.