Cost-minimization analysis of subcutaneous abatacept in the treatment of rheumatoid arthritis in Spain

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Introduction

- Rheumatoid arthritis (RA) is a chronic disabling disease affecting 0,5% of the Spanish population[1]. The development of biologic disease-modifying antirheumatic drugs (DMARDs), has improved RA treatment in the last years.
- Most biologic DMARDs available in Spain [intravenous abatacept (IV ABA), adalimumab (ADA), certolizumab pegol (CZP), etanercept (ETN), golimumab (GLM), infliximab (IFX) and tocilizumab (TCZ)] are indicated in patients that have failed an initial treatment with methotrexate (MTX)[2].
- Since few head-to-head trials comparing biologic DMARDs exist, indirect comparisons have been recently developed[3,4,5].

Objective

To compare the cost of using recently developed subcutaneous abatacept (SC ABA) vs. the rest of first-line DMARDs available in Spain for the treatment of AR patients who have failed an initial treatment with MTX.

Methods

- Analysis included SC ABA, IV ABA, ADA, CZP, ETN, GLM, IFX and TCZ. As SC ABA was considered non-inferior vs. other DMARDs in terms of efficacy and safety according to an indirect comparison[3], a cost-minimization analysis was used.
- A 3-year time horizon was selected to capture possible variations in treatment dosage[6,7], using Spanish National Health System (NHS) perspective.
- Pharmaceutical and administration costs (€, July 2013) were considered. Ex-factory prices[8] with mandatory rebate were used (Table 1).

Table 1. Drug and administration costs

Biologic DMARD	Package	Ex-Factory Price[8]	Ex-Factory Price / vial (7.5% rebate)
SC ABA	4 vials (125mg/vial)	€840.72	€194.42
IV ABA	1 vial (250mg/vial)	€334.82	€309.71
ADA	2 vials (40mg/vial)	€1,028.29	€475.58
CZP	2 vials (200mg/vial)	€948.00	€438.45
ETN	4 vials (50mg/vial)	€947.22	€219.04
GLM	1 vial (50mg/vial)	€1,117.00	€1,033.23
IFX	1 vial (100mg/vial)	€536.28	€496.06
TCZ	1 vial (80mg/vial)	€139.60	€129.13
Administration costs[9]			
Less than 30 min intravenous infusions (IV ABA)			€127.35
30 min to 2 h intravenous infusions (IFX and TCZ)			€155.64
Subcutaneous (ADA, GLM, CZP, ETN, SC ABA)			€14.58*

*Subcutaneous administration by nursing staff. Considered only in 20% of patients based on expert opinion.

- In label recommended doses were considered for all DMARDs except IFX that included dose escalation described in a Spanish observational study[6]. An average weight of 70.3 Kg ±12.1 was used to calculate intravenous drug doses[10] (Table 2).
- Loading dose with IV ABA for 50% of patients initiating treatment with SC ABA was assumed.
- Vial sharing was considered to reflect clinical practice in large hospitals.
- A 3% annual discount rate was applied[11].
- Probabilistic (1,000 simulations) and one-way sensitivity analyses (SA) [±50% loading dose use, considering no vial sharing and alternative dose schedules[7]] were performed.

Table 2. Dose schedules in base-case

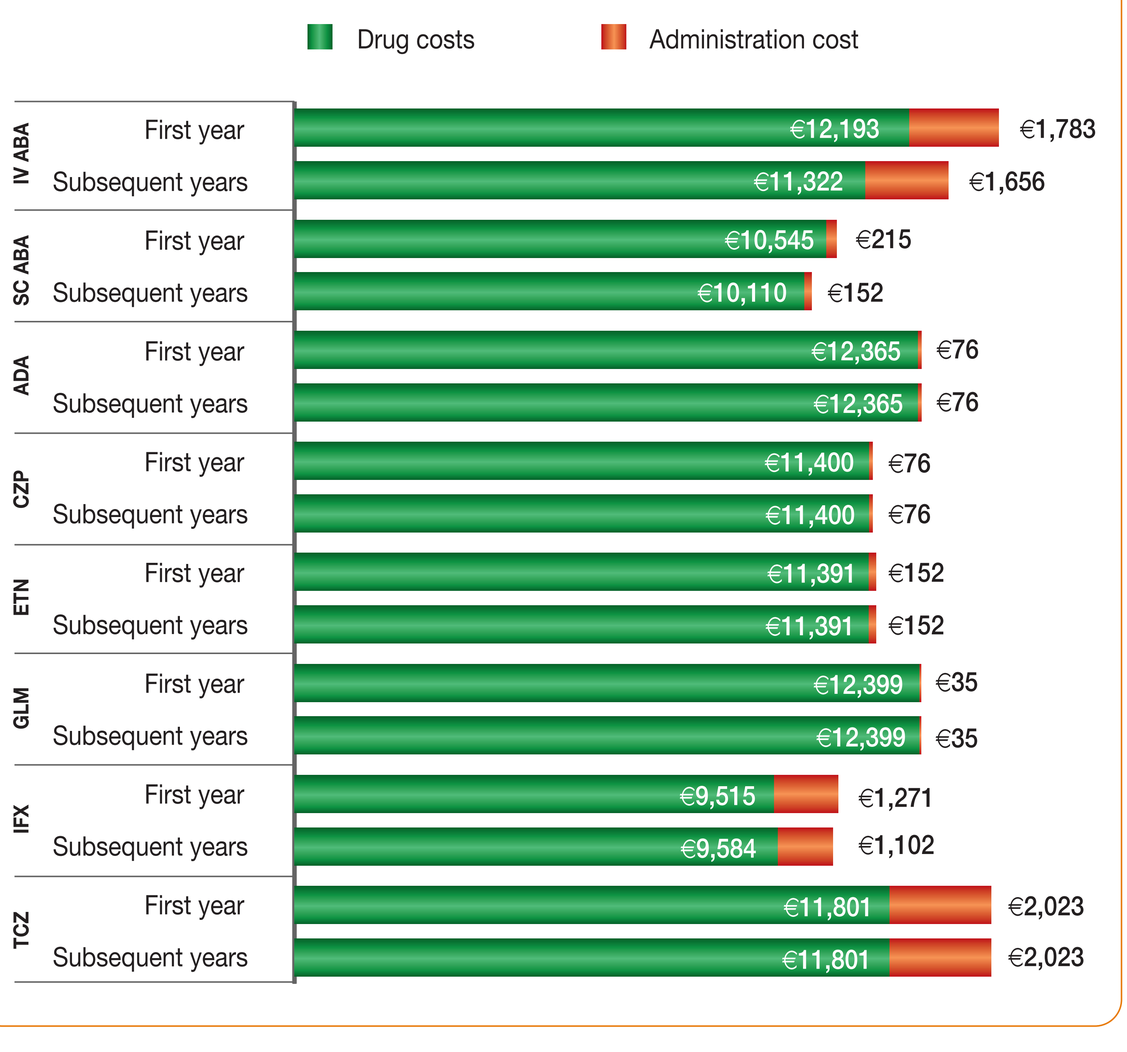
DMARD	Dose schedule
SC ABA	125 mg weekly with (IV ABA) loading dose (10 mg/kg) in 50% of patients.
IV ABA	10 mg/kg in weeks 0, 2 and 4 followed by 10 mg/kg infusions every four weeks.
ADA	40 mg once every two weeks.
CZP	2 subcutaneous injections of 200 mg in weeks 0, 2 and 4 followed by biweekly doses of 200 mg.
ETN	50 mg once a week.
GLM	50 mg once a month.
IFX	3 mg/kg in weeks 0, 2 and 6 followed by 3 mg/kg infusions every 8 weeks*.
TCZ	8 mg/kg once every 4 weeks.

*It was assumed that after 6 months of treatment 8.3% of patients shorten dose intervals from infusions every 8 weeks to every 6 weeks and 44% increase dosage from 3 mg/kg to 5 mg/kg[6].

Results

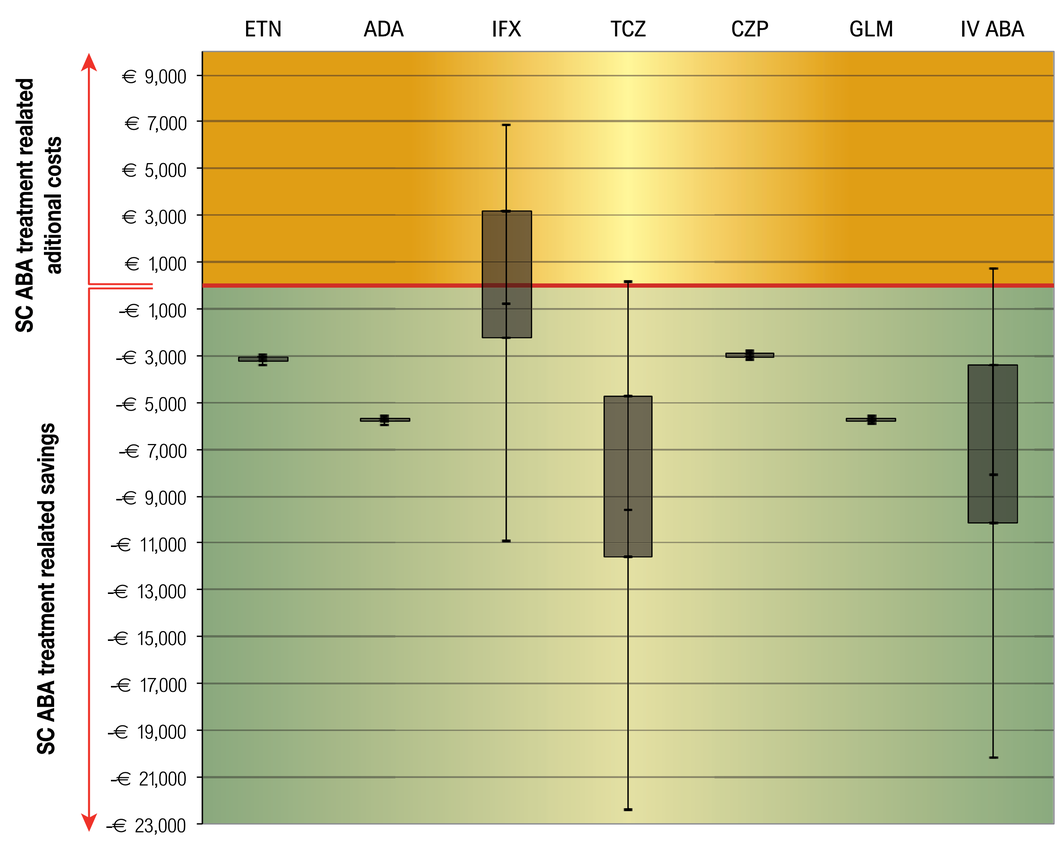
- Yearly cost/patient for SC ABA treatment was €10,760.42 during the first year and €10,261.29 in subsequent years (Figure 1).

Figure 1. Annual cost per patient (first and subsequent years)



- The total 3-year cost/patient of SC ABA was €29,953.89, providing cost savings vs. all other DMARDs that ranged from €831.42 vs. IFX to €9,741.69 vs. TCZ (Table 3).
- SC ABA considering a 3% annual discout rate remained the less costly treatment option in all one-way SA.
- Results of probabilistic SA showed that SC ABA was less costly in 100% of simulations when compared to ADA, CZP, ETN and GLM, and in 99.9%, 99.6% and 62.3% of simulations when compared to TZC, IV ABA and IFX, respectively (Figure 2).

Figure 2. Probabilistic SA results



Box-plot diagram illustrating cost distributions obtained in 1,000 simulations. Boxes represent the 25th to 75th percentiles and horizontal lines within the boxes represent the median values. The ends of the solid lines extending either side of the boxes symbolize the maximum and minimum values.

Table 3. Base-case results (3-year time horizon)

Treatment	Total cost	Drug cost	Administration cost
SC ABA	€29,954	€29,455	€499
IV ABA	€38,254	€33,373	€4,880
ADA	€35,716	€35,499	€218
CZP	€32,944	€32,727	€218
ETN	€33,136	€32,700	€435
GLM	€35,710	€35,610	€101
IFX	€30,785	€27,452	€3,333
TCZ	€39,696	€33,886	€5,810

Conclusions

According to these results, SC ABA treatment in RA patients would lead to cost-savings vs. all other available DMARDs.

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