

Comparing the Cost-Effectiveness of Tazarotene 0.1% Gel and Tretinoin 0.1% Microsponge in the Treatment of Facial Acne Vulgaris

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INTRODUCTION

The results of a multicenter, double-blind, randomized, parallel group have shown that once-daily tazarotene 0.1% gel is more effective than once-daily tretinoin 0.1% microsponge in reducing the noninflammatory lesions of facial acne vulgaris and is at least as effective in reducing inflammatory lesions.¹ A pharmacoeconomic analysis comparing the cost-effectiveness of these regimens is presented here.

METHODS

Study design

- Multicenter, double-blind, randomized, parallel-group study

Inclusion criteria

- Patients at least 12 years of age with mild to moderate facial acne vulgaris, defined as:
 - 10-60 facial inflammatory lesions (papules plus pustules)
 - 10-200 facial noninflammatory lesions (open or closed comedos)
 - No more than 5 nodulocystic lesions (maximum diameter, 5mm)

Washout periods

- 14 days for topical antiacne medications
- 30 days for oral antibiotics or investigational drugs
- 12 months for oral retinoids

Exclusion criteria

- Acne vulgaris resistant to oral antibiotics
- Use of estrogens or oral contraceptives for less than 12 weeks immediately preceding study entry (use for more than 12 weeks was permitted)

Treatment regimen

- Patients were randomized to receive 12 weeks of once-daily treatment with either tazarotene 0.1% gel or tretinoin 0.1% microsponge.

Clinical outcome measures

- Patients were evaluated every 4 weeks in terms of:
 - Global response to treatment (see Table 1 for scale)
 - Total noninflammatory lesion count
 - Total inflammatory lesion count
 - Dryness, burning, pruritus, peeling, and erythema

Cost analysis measures

- Medication usage (assessed using tube weights)
- Cost of medication
- Average total treatment cost (medication cost + cost of an office visit of low complexity (CPT 99213; mean managed care fee of \$67) for patients not achieving treatment success + cost of treating adverse events, if warranted)
- Average cost-effectiveness (i.e. the average total treatment cost per treatment success, where treatment success was defined as $\geq 50\%$ global improvement at the end of the treatment period) was calculated as:

$$\frac{\text{Average Total Treatment Cost per Patient on Regimen}}{\% \text{ Patients Achieving Treatment Success on Regimen}}$$

- Incremental cost-effectiveness ratios were calculated if one regimen was significantly more effective than the other, but was also more costly. Such ratios determine the incremental cost for each additional successfully treated patient and are calculated by dividing the difference in total treatment cost by the difference in the incidence of treatment success as follows:

Incremental cost per treatment success =

$$\frac{\text{Total Treatment Cost for Regimen 1} - \text{Total Treatment Cost for Regimen 2}}{\text{Incidence of Treatment Success with Regimen 1} - \text{Incidence of Treatment Success with Regimen 2}}$$

Such ratios are not calculated if one regimen is both more effective and less costly than the other as the original regimen is considered to be the dominant/preferred treatment option.

Sensitivity analyses

- The following one-way sensitivity analyses for medication usage, cost, and efficacy were performed to determine the robustness of the cost-effectiveness analyses:
 1. What if medication usage was the same for both regimens?
 2. What if total treatment costs were the same for both regimens?
 3. What if treatment success was defined as $\geq 75\%$ or $\geq 90\%$ global improvement?

Table 1. Grading scale used to assess the global response to treatment.

Grade	Scale	Definition
Cleared	0	No signs or symptoms of acne
Almost cleared	1	~90% improvement from baseline (very significant clearance with only traces of disease remaining)
Marked	2	~75% improvement from baseline (significant improvement with some disease remaining)
Moderate	3	~50% improvement from baseline (between mild and marked improvement)
Mild	4	~25% improvement from baseline (some improvement but significant disease remains)
No change	5	No detectable change from baseline
Exacerbation	6	Worsening of the signs and symptoms

Patient demographics

- 169 patients enrolled (84 tazarotene, 85 tretinoin microsponge), of whom 154 (91%) completed.
- Mean age, 18 years

Clinical data

- At week 12, and compared with tretinoin microsponge, tazarotene treatment achieved a significantly:
 - Improved global response score (mean of 2.80 versus 3.35, $p \leq 0.05$) (Figure 1)
 - Greater incidence of treatment success ($\geq 50\%$ global improvement) (67% versus 49%, $p \leq 0.05$)
 - Greater incidence of patients achieving $\geq 75\%$ global improvement (46% versus 25%, $p \leq 0.01$)
 - Greater reduction in overall disease severity score (by a mean of 36% vs. 26%, $p \leq 0.05$)
 - Greater reduction in noninflammatory lesion count (median of 60% versus 38%, $p \leq 0.05$; Figure 2).
- There was no significant between-group difference in the percentage reduction in inflammatory lesion count (median of 56% versus 46%; Figure 3).
- No patients discontinued prematurely due to lack of efficacy.
- 2 patients in each group discontinued prematurely due to treatment-related adverse events.
- Mean levels of dryness, burning, pruritus, peeling, and erythema were less than mild in both groups and therefore no potential additional costs (eg, for medication or office visits) were included. (Additional costs would be unlikely even in the event of an individual experiencing retinoid irritation with greater than mild severity as this is best resolved by either suspending treatment temporarily or reducing the frequency of medication application.)

Medication usage

Average medication usage was 0.28 g per application of tazarotene and 0.41 g per application of tretinoin microsponge ($p \leq 0.05$). Thus, patients used 32% less tazarotene gel by weight than tretinoin microsponge per application.

The average amount of medication used per month was:

- 8.40 g for tazarotene [0.28 g x 30 days]
- 12.30 g for tretinoin microsponge [0.41 g x 30 days]

Considering the entire 12-week treatment period, the average amount of medication used was:

- 23.52 g for tazarotene [0.28 g x 7 days x 12 weeks]
- 34.44 g for tretinoin microsponge [0.41 g x 7 days x 12 weeks]

Medication cost

Using average wholesale prices (Nov 2001)² for a 30 g tube of tazarotene 0.1% gel and a 45 g tube of tretinoin 0.1% microsponge, the average cost of medication per month was:

- \$19.49 for tazarotene [8.40 g x \$2.32/g]
- \$19.93 for tretinoin microsponge [12.30 g x \$1.62/g]

Thus, the average cost of medication for the entire 12-week treatment period was:

- \$54.57 for tazarotene [23.52 g x \$2.32/g]
- \$55.79 for tretinoin microsponge [34.44 g x \$1.62/g]

Average total treatment cost

- Assuming that patients not achieving treatment success would return to their physician for another consultation, the cost of an office visit of low complexity (CPT 99213; mean managed care fee of \$67) was added to the cost of medication for this subgroup of patients. Thus, the average total treatment cost was:
 - \$76.68 for tazarotene [\$54.57 for medication + (\$67 x 33% patients not achieving treatment success) for office visit]
 - \$89.96 for tretinoin microsponge [\$55.79 for medication + (\$67 x 51% patients not achieving treatment success) for office visit].

Average cost per treatment success

- Taking into account the fact that treatment success was not achieved in every patient (it was attained in 67% of the tazarotene group and 49% of the tretinoin microsponge group), the average total cost of treatment per treatment success was:
 - \$114.45 for tazarotene [\$76.68/0.67]
 - \$183.59 for tretinoin microsponge [\$89.96/0.49]
- Thus, tazarotene was both more efficacious and more cost-effective than tretinoin microsponge.

Sensitivity analyses

- As detailed in Table 2, the tazarotene regimen remained the dominant/preferred regimen, or a cost-effective alternative to tretinoin microsponge, in all sensitivity analyses—i.e., even if both regimens have the same medication usage or total treatment cost, or if the definition of treatment success is changed to $\geq 75\%$ or $\geq 90\%$ global improvement (Figure 4).

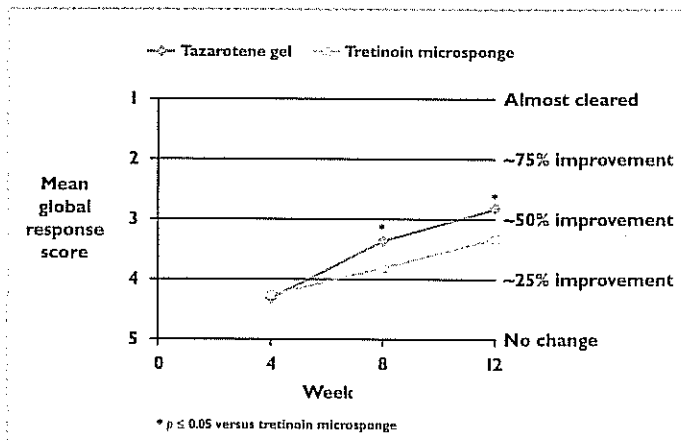


Figure 1. Mean global response score.

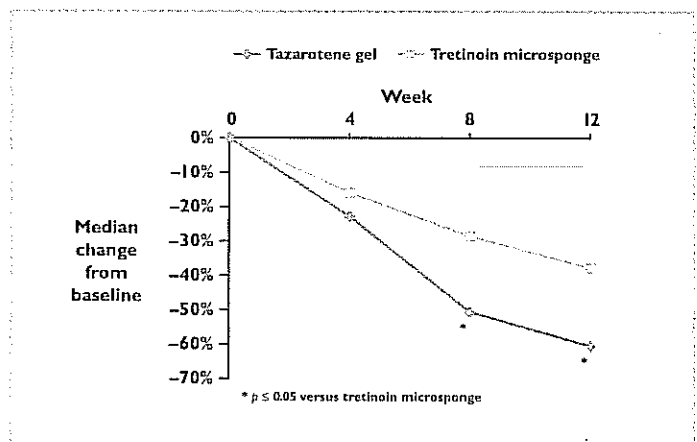


Figure 2. Median percentage reduction in noninflammatory lesion count (open plus closed comedos).

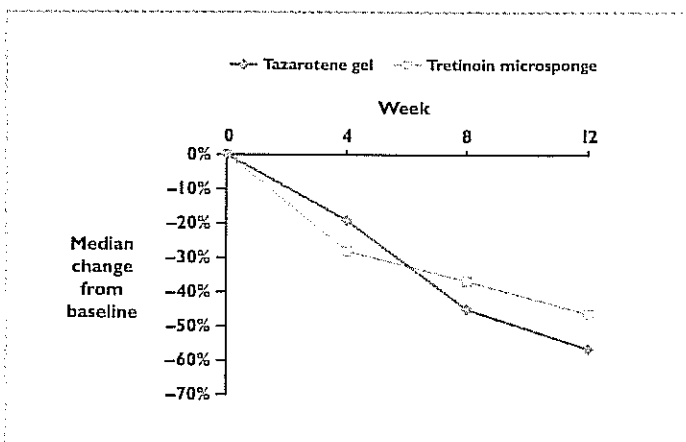


Figure 3. Median percentage reduction in inflammatory lesion count (papules plus pustules).

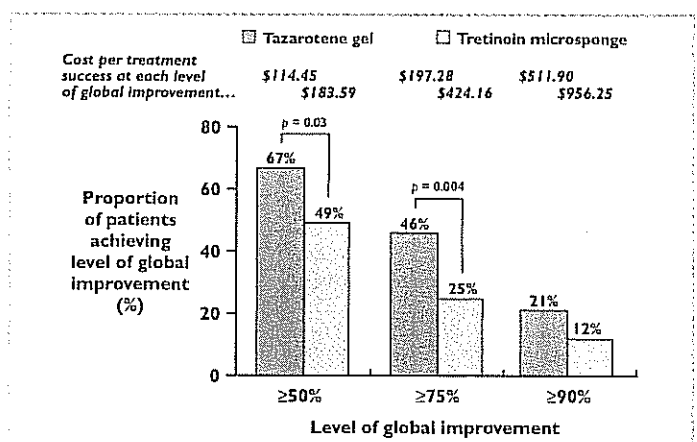


Figure 4. Proportion of patients achieving $\geq 50\%$, $\geq 75\%$, and $\geq 90\%$ global improvement at the last completed assessment and corresponding treatment costs per patient achieving each response level.

Table 2. Summary of results from reference case analyses and one-way sensitivity analyses.

Scenario	Tazarotene	Tretinoin microsphere	Results of Incremental Cost-Effectiveness Analysis*
<i>Reference case analyses</i>			
Average total treatment cost [†] for 12 weeks	\$76.68 [‡]	\$89.96 [‡]	
Incidence of treatment success (≥ 50% global improvement)	67%	49%	
Average cost per treatment success	\$114.45/ treatment success	\$183.59/ treatment success	Tazarotene is dominant/ preferred regimen
<i>Sensitivity analyses</i>			
Average cost per treatment success when...			
Medication use is equal in both groups @ 0.28 g/application	\$114.45/ treatment success	\$147.49/ treatment success	Incremental cost-effectiveness ratio = \$24.50/additional treatment success over 12 weeks
Total treatment cost is equal in both groups @ \$76.68	\$114.45/ treatment success	\$156.49/ treatment success	
Treatment success definition = ≥ 75% global improvement	\$197.28/ treatment success	\$424.16/ treatment success	Tazarotene is dominant/ preferred regimen
Treatment success definition = ≥ 90% global improvement	\$511.90/ treatment success	\$956.25/ treatment success	Tazarotene is dominant/ preferred regimen
* Incremental cost-effectiveness ratio =			
$\frac{(\text{Cost of tazarotene} - \text{cost of tretinoin microsphere})}{(\text{Incidence of treatment success with tazarotene} - \text{incidence of treatment success with tretinoin microsphere})}$			
Where tazarotene is both more effective and less costly, it is concluded to be the dominant/preferred regimen.			
[†] Cost of treatment comprises medication cost and one office visit of low complexity (CPT 99213) for the proportion of patients not achieving treatment success. Mean managed care fee for this office visit calculated to be \$67 from the Physician Fees and Coding Guide.			
[‡] \$54.57 medication cost + \$22.11 office visit cost.			
[§] \$55.79 medication cost + \$34.17 office visit cost.			

CONCLUSIONS

These data suggest that tazarotene 0.1% gel is a more cost-effective treatment for facial acne vulgaris than tretinoin 0.1% microsphere (as well as also offering significantly superior efficacy against noninflammatory lesions). Using established cost per gram data for each treatment, the average total treatment cost for the 12-week treatment period was \$76.68 for tazarotene and \$89.96 for tretinoin microsphere. Combining these with the treatment success data resulted in average cost-effectiveness ratios of \$114.45/treatment success for tazarotene and \$183.59/treatment success for tretinoin microsphere. Incremental cost-effectiveness analyses further demonstrated that tazarotene was the dominant/preferred treatment option, or a cost-effective alternative to tretinoin microsphere, across a range of medication usage, total treatment cost, and efficacy assumptions.

REFERENCES

- Leyden JJ, Tangheci EA, Miller B, et al. Once-daily tazarotene 0.1% gel versus once-daily tretinoin 0.1% microsphere gel for the treatment of facial acne vulgaris: a double-blind randomized trial. *Cutis* 2002;69(suppl 2):12-19.
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