Safety of topical vitamin K1 for epidermal growth factor receptor inhibitor (EGFRI)-induced rash

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INTRODUCTION

Study Objective:

Evaluate the safety of a topical 0.1% vitamin K1 product for potential use in patients with EGFR-induced rash.

- ✓ Palpupustular rash occurs in 80% of patients EGFR for cancer treatment.
- ✓ Rash often results in decreased quality of life and discontinuation of EGFR therapy.
- ✓ Topical Vitamin K1, a phosphatase inhibitor, could reduce rash severity in skin without systemic interference of EGFR inhibition in the tumor.
- ✓ Topical 0.1% vitamin K1 product evaluated had the least systemic absorption potential & most cosmetically desirable formulation.

METHODS

Healthy Volunteer Pilot Trial

- 10 health volunteers (Caucasian, Female, age range = 22-65 years) Topical vitamin K1 applied to forearm every 12 hours for five doses without (Phase 1) or with (Phase 2) tape-stripping. .
- Blood (serum & plasma) collected at 0, 26, and 50 hours in both Phase 1 & 2.
- Human Vitamin K1 ELISA (MyBioSource).

In vitro Study

Does vitamin K1 interfere with cetuximab-induced inhibition of EGFR?

- A549 cells cultured at 37°C (5% CO₂) in RPMI media (+10% FBS (heat-inactivated) +penicillin/streptomycin/glutamine).
- Semi-quantitative Human Phospho-EGFR (Tyr1068) and Total EGFR ELISA Kit (RayBiotech).

RESULTS

- Highest vitamin K1 level = 8.22 ng/ml in plasma at 50 hrs in healthy skin model.
- Overall, mean plasma vitamin K1 levels were higher than mean serum vitamin K1 levels (1.87 [1.43, 2.32] vs. 1.10 [0.66, 1.55], p=0.017).
- MANOVA did not show significant differences in mean vitamin K1 levels over time for serum or plasma (p=0.175) in healthy or inflamed skin (p=0.966).
- Overall, healthy skin vitamin K1 levels were not significantly different than inflamed skin vitamin K1 levels (1.47 [1.03, 1.92] vs. 1.50 [1.03, 1.97], p=0.930) .

Phosphorylated-EGFR in A549 lung cancer cells.

CONCLUSIONS

- Application of topical 0.1% vitamin K1 product to healthy or simulated inflamed skin did not result in significant increases in vitamin K1 levels in serum or plasma.
- Vitamin K1 (2.5ng -100ng) did not interfere with cetuximab-inhibition of EGFR in A549 lung cancer cells.
- Our topical 0.1% vitamin K1 product appears safe for use in patient receiving EGFR therapy.