

STUDIES IN NEONATAL DIAPER DERMATITIS

II. Use of a Powder Containing Undecylenate*

Vedat Sezer, M.D.,** and Hans Keitel, M.D.***

Various powders have been reported to help in the prevention and treatment of diaper dermatitis in infants. In the present study, a powder (Caldesene, 15 per cent calcium undecylenate in a neutralized talc base) containing fungicidal, bactericidal, and absorbent agents was used with each diaper change in order to observe its effectiveness in preventing diaper dermatitis of newborn infants.

Methods and Materials

Five hundred and three infants were studied from birth until three to five days old. They were kept in the supine position throughout the nursery course. Similar diapers, bedding material, baths and formula were used for all infants.

Immediately on admission to the nursery, the babies were assigned in strict rotation to either receive the powder or to serve as controls. Of the infants who remained in the nursery for at least three days, 248 were assigned to the experimental group and 255 to the control group. Discharge before the third day of life and development of complications account for the unequal number of babies in the two groups. The powder was applied to the gluteal-perineal pubic area after each diaper change.

Each day the babies were completely undressed, washed and then examined under a bright light for evidence of diaper dermatitis. The previous application of powder was not apparent at that time. The severity of diaper rash was graded as follows: mild, if erythema was present; severe, if ulceration, maceration, or hemorrhage were present; moderate, if papules and erythema were present. Patch tests with the powder were applied for 24 hours to all the babies in order to exclude the possibility that the infants might be sensitive to the powder.

* From the Departments of Pediatrics, Episcopal and Jefferson Hospitals, 1025 Walnut Street, Philadelphia, Pennsylvania.

** Pediatric Dermatologist, Ankara University Hacettepe Faculty of Medicine.

*** Chief, Department of Pediatrics, Jefferson Hospital, Philadelphia.

Results

A total of 503 infants were studied, and 29 per cent of these developed diaper rash. This incidence of diaper rash in the neonatal period is in keeping with the findings reported elsewhere.^{1,3} Of the 248 infants who received the powder, 23 per cent developed diaper rash. In 7 per cent of these, the rash was mild; in 11 per cent, it was moderately severe; and in 5 per cent, it was severe. Thirty-five per cent of the infants in the control group developed diaper dermatitis. In this group, 8 per cent of the cases were mild, 17 per cent were moderately severe, and 10 per cent were severe (Table 1).

TABLE 1
THE USE OF CALDESENE POWDER DURING THE FIRST WEEK OF LIFE

	Number of infants studied	Incidence of gluteal diaper dermatitis	Severity of diaper dermatitis		
			Mild	Moderate	Severe
Infants receiving Caldesene powder	248	57 (23 %)	17 (30%) ^c	27 (47%)	13 (23 %)
Control infants	255	89 (35 %)	21 (23%)	42 (47.2%)	26 (29.2%)

The difference in the incidence of diaper rash between the experimental group and the control group has a *p* value of 0.05. The results of all the patch tests were negative.

Discussion

Many etiological mechanisms have been postulated for diaper dermatitis, and for each, specific remedies have been suggested. In addition to powders, methionine,⁴ silicones,^{5,6} quaternary ammonium compounds (Diaparene),^{7,9} Bactine,¹⁰ vinegar¹¹ and Vioform (containing hydroxyquinoline)^{12,13} have been said to be effective for preventing or treating diaper rash. In very few instances, however, have the claims been supported by controlled clinical studies.

Caldesene powder contains talcum, 82 per cent; borax, 3 per cent; and calcium undecylenate, 15 per cent. The latter agent, when moistened, is hydrolyzed into undecylenic acid. The salts of undecylenic acid have been widely used for superficial mycotic infections, and for preventing diaper dermatitis.¹⁴ They are reported to be weak organic acids and have anti-bacterial, anti-fungal, anti-pruritic, and

mild keratolytic properties. It is not possible to ascertain which of these properties, if any, resulted in suppressing diaper rash. It is possible that talc alone may be the effective agent.

Summary

The incidence of diaper dermatitis in newborn infants receiving a powder application to the gluteal area was 23 per cent as compared to 35 per cent in the control group. The active ingredient of the powder was 15 per cent calcium undecylenate. Patch tests showed no evidence of sensitivity to the powder.