

## Atopy Patch Test in Children with Cow's Milk Allergy

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## DESCRIPTION

It has been suggested that the Atopy Patch Test (APT) be used as a research tool to evaluate kids who have a clinically likely non-IgE-mediated food allergy. One of the most typical food allergies in kids is CMA, or allergy to cow's milk. Non-IgE-mediated CMA symptoms typically manifest after two hours and involve the gastrointestinal tract (proctocolitis, for example), the skin (dermatitis), or both.

Children with atopic dermatitis and gastrointestinal issues associated with CMA have been studied using the APT with fresh cow's milk. The usefulness of CMA diagnosis, however, is still debatable. Additionally, the restriction is that allergies in fresh foods deteriorate quickly. APT can be carried out using a liquid solution on filter paper. The commercial extract product is simpler to make and use in clinical practise than raw allergens and is more stable. Currently, skin testing solutions made from cow's milk are accessible. Furthermore, the main allergens in com's milk, which can be purchased as test solutions commercially, are casein,  $\beta$ -lactalbumin, and  $\alpha$ -lactoglobulin.

To our knowledge, no study has examined the APT's accuracy using commercially available cow's milk extracts or the precise amounts of casein,  $\beta$ -lactalbumin or  $\alpha$ -lactoglobulin. Additionally, the APT using fresh cow's milk among Thai youngsters has not been studied. In this study, casein,  $\beta$ lactalbumin and  $\alpha$ -lactoglobulin were extracted from fresh cow's milk and commercial cow's milk extracts to assess the diagnostic performance of the APT in children with suspected CMA.

In this work, we sought to establish the APT's accuracy in detecting non-IgE-mediated CMA in children with clinical suspicion using fresh milk, commercial cow's milk extracts, casein,  $\beta$ -lactalbumin, and -lactoglobulin. For fresh milk, the sensitivity was 40%, which was consistent with earlier investigations. Additionally, the results of our sensitivity analysis agreed with a meta-analysis by Lou et al., who stated that the APT's pooled sensitivity for cow's milk was 44.2% (95% Confidence Interval (CI) 41.5%-47.0%).

In comparison to other studies that tested with fresh milk and reported specificities of 95%-96%, the APT had a poor specificity (65.6%) for fresh milk, while a meta-analysis revealed a result of 86.9% (95% CI 85.0%-88.7%). The high rate of false positives may be related to the low specificity. Patients who tested positive for APT but showed tolerance to cow's milk consumption were considered false positives; as a result, the results in those patients were not clinically significant. Our investigation revealed that fresh milk has a significant rate of false positives. False positive APT test results may be the consequence of the skin being overly sensitive to irritants or allergens, or from patch testing on skin that has an active dermatitis. In order to reduce the likelihood of false positives, we used the Finn Chamber, which was consistent with earlier investigations and has a built-in hypoallergenic adhesive. We used vaseline as a negative control to weed out erroneous positive results. Before the APT test, the skin appearance of every youngster was normal.

It should be emphasised that some of our erroneous positive results from an irritating extract may have been brought on by external factors. Thailand is located in a tropical area with constant humidity, which causes food to decay quickly, particularly dairy items. Additionally, our investigation found that using powdered skim milk diluted in isotonic saline solution as a vehicle had a low specificity and a large false positive rate. These findings confirm the prudence that should be exercised when doing the APT with fresh meals in tropical and humid regions.

The APT used in this study, which used powdered skim milk, had sensitivity similar to one from a prior study, but a lower specificity. 32 kids with non-IgE mediated CMA underwent the APT by Gonzaga et al. using skimmed cow milk powder in a saline solution. Results for sensitivity and specificity were 33% and 96%, respectively. Although the APT's commercial cow's milk solution had a low sensitivity, it had a high specificity of 93.8%. The results were in line with those of a previous study done in Thailand. When using commercial allergen extracts, 90% of the APT's results were precise.

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The primary allergens in cow's milk have recently been identified as casein, lactoglobulin, and lactoalbumin, employed lyophilized cow's milk and casein in white Vaseline as the excipient in the ATP. The specificity (80%) was higher than the sensitivity (15%). These three allergens' skin test solutions are available, but there isn't enough *in vivo* data to support testing

in kids who have non-IgE-mediated reactions. We discovered that the APT employing commercial extracts of casein, - lactalbumin, and -lactoglobulin produced modest sensitivities but high specificities in the 90–100% range, which was consistent with earlier investigations using lyophilized food in white Vaseline as the excipient.