Comparative study of therapeutic effect of common salt application for 10 minutes versus 30 minutes in the treatment of umbilical granuloma in infants

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Received - 22 June 2019 Initial Review - 18 July 2019 Accepted - 23 August 2019

ABSTRACT

Background: Various studies have advised application of common salt for 30 min twice a day for 3–7 days in the treatment of umbilical granuloma (UG). However, application for 30 min in infants is distressing to both parents and baby. O**bjectives**: The objectives of this study were to compare the therapeutic effect of short application time (10 min) with long application time (30 min) of common salt in the treatment of UG. **Materials and Methods:** This quasi-experimental randomized study was conducted in the department of pediatrics of a tertiary care teaching hospital of Kolhapur. A total of 60 infants of 3–12 weeks of age with clinically diagnosed UG were included and 30 infants were randomly divided into each group. After thoroughly demonstrating the method of salt application to parents, they were asked to apply a pinch of salt over the UG twice a day for 7 days. Before and after the salt applications, site was cleaned with cotton ball soaked in cold boiled water. After salt application, area was covered with adhesive tape for 10 min in Group A and 30 min in Group B. Infants were evaluated after 1 and 3 weeks to look for therapeutic response as total, partial, or no response. The data were analyzed statistically. **Results:** Of 60 infants, 40 (66.66%) were in between 3 and 6 weeks of age group. There were 33 (51.66%) males and 29 (48.34%) females. Therapeutic total response was showed in 57 (95%) infants from both groups with 28 (93.33%) infants from Group A as compared to 29 (96.66%) from Group B. Partial response was shown in 2 (6.67%) infants in Group A and 1 (3.34%) infant in Group B, respectively. Therapeutic effect of salt application for 10 min and 30 min was statistically similar. **Conclusion:** Common salt could be used for just 10 min twice a day for 7 days in the treatment of UG.

Key words: *Common salt, Therapeutic response, Umbilical granuloma*

Umbilical granuloma (UG) is an overgrown tissue that develops during the healing process of the umbilicus, usually in reaction to a mild infection. It typically presents as a tiny segment of brightly red, slightly wet flesh that remains in the umbilicus after cord separation, where normal healing should have happened [1]. The prevalence of UG has been reported as 1 in 500 newborns [1]. UG continues to be a chronic problem in infants and causes much distress and anxiety to the parents [2]. UG is often noted by parents due to continuous drainage or moisture involving the umbilicus, after the cord has dried and separated [3]. Due to its irritation, discomfort, and continuous oozing of watery discharge, treatment is necessary [4]. Spontaneous regression of UG is unknown, so some kind of treatment must be instituted. There are different treatment modalities of this condition such as chemical cauterization, electrocauterization, cryocauterization, ligation, and surgical excision [5].

The therapeutic effect of common salt was first described by Schmitt, in 1972 [6]. Application of common salt is easy, simple, and cost effective, an outpatient department (OPD) based treatment modality, does not need any specialized instrument and without any adverse effects. Various studies had advised application of common salt for 30 min or more, 2 times a day for 3–7 days and showed more than 90% effectively [4,7-9]. However, the application of common salt for 30 min or more in infants is distressing to both parents and baby. This study was carried out to compare therapeutic effect of short application time (10 min) with long application time (30 min) 2 times a day for 7 days of common salt in the treatment of UG.

MATERIALS AND METHODS

This prospective, quasi-experimental, randomized, comparative study was conducted in the OPD of pediatrics of a tertiary care teaching hospital of Kolhapur from June 1, 2017, to March 31, 2019. The study was approved by the institutional ethical committee. Informed and written consent was taken from the parents/guardians. A total of 60 infants between the age group of 3 and 12 weeks who were brought by parents/caretakers with clinically evident UG were included in the study. All infants were thoroughly examined by a single investigator to exclude other

umbilical problems and to include only clinically diagnosed UG. Infants having UG with other acute problems such as pneumonia, diarrhea, and generalized sepsis were excluded from the study. Infants with localized signs of umbilical sepsis were also excluded from the study. All these infants were included later, once the acute problem settled down.

After thoroughly explaining and demonstrating the method of salt application to all parents/caretakers, first, the site was cleaned with cotton ball soaked in cold boiled water. Then, they were asked to apply a pinch of salt over the UG. The care was taken not to use too much salt as it will damage the normal skin around the umbilicus. The umbilical site was covered with adhesive tape for 10 min and 30 min in Group A and Group B, respectively. In each group, there were 30 infants and they were selected randomly. The site was cleaned again after recommended period of salt application using cotton balls soaked in cold boiled water. The salt application was carried out twice a day for 7 consecutive days in both groups.

The infants from both groups were evaluated and examined by another investigator in OPD after 1 and 3 weeks from the first application to look for therapeutic effect of common salt and for relapse of UG, respectively. The therapeutic effect was graded in three categories as (A) total response (complete regression, no discharge, and healing with complete epithelization), (B) partial response (partial regression and some discharge), and (C) no response (no regression and persistent umbilical discharge).

The data regarding age and gender were analyzed statistically using Fisher's exact test and Chi-square test, respectively. The therapeutic response of salt application in both groups was analyzed statistically using proportional test where 5% level of significance was significant.

RESULTS

In our study, a total of 60 infants with clinically diagnosed UG were studied, of which 30 infants were subjected for 10 min salt application (Group A) while another 30 infants for 30 min salt application (Group B) for the treatment of UG. The majority 40 (66.66%) infants with UG were in between 3 and 6 weeks of age group and only 2 (3.34%) infants were in between 9 and 12 weeks age group (Table 1). There were 33 (51.66%) infants with UG who were male while 29 (48.34%) were female (Table 2). There was no statistically significant difference between the two groups regarding age and sex.

Therapeutic effect of common salt application was evaluated after 1 week of treatment. The total response was seen in 57 (95%) infants from both groups and 28 (93.33%) from Group A as compared to 29 (96.66%) from Group B. Partial response was shown by 3 (5%) infants from both groups and 2 (6.67%) and 1 (3.34%) infants from Groups A and B, respectively (Table 3).

The partial response was due to non-compliance of treatment by parents or caretakers. There was not a single infant with no response in both the groups. Therapeutic effect in the form of total response of common salt application in Group A was similar to that seen in Group B and was statistically significant at 5% level of significance as the calculated Z value (0.5923) of proportional test is less than tabulated value (1.96).

Table 1: Age-wise distribution in the study groups

Age group (weeks)	Number of infants in the study groups		Total, n=60 (%)
	Group A, n=30	Group B, n=30	
3–6	19	21	40 (66.66)
6–9	10	8	18 (30.00)
9–12	1	1	2 (03.34)
Total	30	30	60 (100)

Table 2: Sex-wise distribution in the study groups

Sex	Number of infants in the study groups		Total, n=60 (%)
	Group A, n=30	Group B, n=30	
Males	16	17	33 (51.66)
Females	14	13	27 (48.34)
Total	30	30	60 (100)

Table 3: Infants in the study group showing clinical response after salt application

Response	Infants in the study group		Total
	Group A	Group B	
	Number (%)	Number (%)	Number (%)
Total response	28 (93.33)	29 (96.66)	57 (95)
Partial response	2 (6.67)	1 (3.34)	3 (5)
No response	00 (00)	00 (00)	00 (00)
Total	30 (100)	30 (100)	60 (100)

DISCUSSION

UG is the most common umbilical problem in infants. UG is defined as a moist fleshy and pink granulation tissue at the center of the umbilicus [2]. Following cord separation, incomplete epithelization may happen over the fibromuscular ring of the umbilicus and an area of beefy red tissue or granulation tissue is seen. This normal granulation tissue of the resolving umbilical stump of a newborn should vanish by the 2nd or 3rd week of birth with correct hygiene. Granulation tissue could grow excessively at the umbilicus and lead to UG [2]. Histopathologically, it predominantly consists of a fibroblast, copious small blood vessels, endothelial and inflammatory cells in an edematous stroma, and devoid of any nerve tissue [2,8]. Although the exact cause of UG is unknown, an inflammatory process and delay in the umbilical cord separation are suggested for its formation [3,8]. Although different treatment modalities showed a curative effect, with each modality, there are some advantages and disadvantages. However, application of common salt has proved advantageous. Furthermore, it is simple as the parent or caretaker can apply it safely and correctly after simple explanation and demonstration without any mistake.

In our study, we have demonstrated that the therapeutic effect of common salt for 10 min application was as similar as 30 min application. Hence, in the treatment of UG, instead of 30 min salt application, 10 min salt application was more than sufficient for therapeutic effect. This is the first study of its kind where we studied positive therapeutic effect of common salt by applying for just 10 min which will benefit in lowering distress in both parents and babies. Tripathi *et al.* [4] and Hossain *et al*. [8] studied positive therapeutic effect with success rate of 96.3% and 91.7%, respectively, with 30 min salt application. Saleh [9] and Kesaree *et al.* [10] reported 100% success rate in their study population with 30 min salt application. Farhat and Mohammadzaden [11] compared between 2 and 24 h salt powder application in the treatment of infant UG and showed that 24 h treatment was more effective than 2 h treatment method.

The curative mechanism of common salt is due to its desiccant effect and biologic properties [6]. The high concentration of sodium ion in the area draws water out of the cells and results in shrinkage and necrosis of the wet granulation tissue and the whole granuloma gets replaced by normal epithelial cells [6]. However, this effect is not so powerful as to cause damage to normal surrounding cornified tissue when applied for short treatment duration and it is a painless procedure as the target tissue has no nerve [12].

The limitation of our study was that we did not study serum sodium levels to assess the theoretical risk of hypernatremia due to salt application. However, none of the infant presented with clinical signs of hypernatremia. Furthermore, we did not find any local or systemic adverse effects and relapse after application of common salt.

CONCLUSION

Therapeutic effect of common salt application for 10 min was as similar as 30 min application in the treatment of UG. Common salt could be used for just 10 min application twice a day for 7 days in the treatment of UG in infants.

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Kavthekar SO, Singh BK, Patil MA, Kurane AB. Comparative study of therapeutic effect of common salt application for 10 minutes versus 30 minutes in the treatment of umbilical granuloma in infants. Indian J Child Health. 2019; 6(8):459-461.

Doi: 10.32677/IJCH.2019.v06.i08.016