

## Ojeola Tioluwanimi O Oyeyemi Bashir O

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# Effective home treatment of umbilical granuloma using table salt in African children

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Ojeola Tioluwanimi O (✉)  
Oyeyemi Bashir O  
Saint Nicholas Hospital, Lagos  
Island, Lagos, Nigeria.  
Email:  
drojeolatioluwanimi@gmail.com

**Abstract:** *Introduction:* Following the adoption of home based, table salt treatment for Umbilical granuloma in our practice, we observed that there was a paucity of report on the use of table salt for the treatment of Umbilical granuloma in African children. We report the outcome of treatment of eight children treated with Table salt in our facility.

*Methods:* We carried out a retrospective review of the medical records of infants who were diagnosed with umbilical granuloma and were managed using table salt in our hospital in 2019 and 2020. Additional data about diagnosis, treatment and outcome were extracted from records of electronic communications via emails and WhatsApp® between the Paediatrician and caregivers of these infants. Written informed

consent of caregivers of the infants were obtained and the study received approval of the Research and Ethics Committee of our Hospital.

*Results:* Nine infants were diagnosed with Umbilical granuloma during the study period but informed consent was obtained for eight of them. All eight children (100%) treated with table salt had resolution of umbilical granuloma confirmed at the end of the treatment period without any adverse event.

*Conclusion:* Home based, Table salt treatment was found to be safe and effective treatment for umbilical granulomas among the children treated in our facility.

**Keywords:** Umbilical granuloma, home treatment, table salt,

Umbilical granuloma is one of the most common abnormalities of the umbilicus. It presents as a moist, reddish, granular, painless beefy swelling on the umbilicus with or without serous discharge. It is noticed after cord separation, in an otherwise healthy child.<sup>1-3</sup> While it is often a cause of significant anxiety for caregivers, no prior research has demonstrated the natural course or any deleterious effect of untreated umbilical granuloma<sup>4,5</sup>.

While the exact cause of umbilical granuloma remains unproven, this failure of normal process of epithelialization of the umbilical surface was associated with specific cord clamping practices and subclinical infection in some studies.<sup>1,6-8</sup>

Umbilical Granuloma has been successfully treated with cautery (Chemical and Electrocautery), Cryotherapy and Surgical excision.<sup>1,4,9,10</sup> The use of table salt is a relatively late addition to the modalities of treatment. Treatment with table salt has been demonstrated to be equally efficacious, more cost effective and safe.<sup>5,11-14</sup> Therapy using table salt has not been associated with a number of complications and disadvantages found with the use of other modalities of treatment such as repeated hospital visits, burns to normal tissue, potential damage to persis-

tent vitelline structures, and requirement of equipment and technical expertise.<sup>1,4,5,15</sup> Table salt is postulated to exert a desiccant effect on the granuloma without significantly affecting the surrounding skin and subcutaneous tissues.<sup>6,13</sup>

This study was prompted by the discovery of publications suggesting table salt as an alternative therapy, when we were faced with the challenge of getting silver nitrate or copper sulphate for chemical cautery. The table salt therapy was effective in this case and we adopted this as the first line treatment for subsequent cases using a standard protocol.<sup>16</sup>

Even though the effectiveness of common salt for the treatment of umbilical granulomas was reportedly demonstrated almost five decades ago,<sup>4,12,13</sup> and the safety and efficacy was demonstrated in subsequent studies<sup>9,11,17,18</sup>, we did not come across any study on the use of table salt for the treatment of umbilical granuloma in Nigerian children and only one in an African child.<sup>14</sup> To promote the awareness and utilization of this cheap, effective, simple and safe treatment for umbilical granuloma we present the outcome of treatment of eight cases with table salt in our practice.

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## Methodology

We carried out a retrospective review of the clinical records of infants diagnosed as having umbilical granuloma and treated with table salt in our hospital in 2019 and 2020. Data was extracted from the clinical record of each infant. Additional data was extracted from records of communications between the Paediatrician and caregivers of these infants. The communications were exchanged on electronic platforms by electronic mails and/ or WhatsApp®. These data were recorded and analyzed using Microsoft Excel. Written informed consent of caregivers of the infants were obtained. The manuscript was vetted by the Research and Ethics Committee of our hospital.

Data extracted from the records include the following: sex, gestational age at birth, age at diagnosis, significant conditions occurring since the child was born and age at confirmation of resolution.

The diagnosis of umbilical granuloma was made on direct physical examination or by an examination of the photographs of the umbilicus received by the second author from the caregiver. The finding of red-fleshy tissue protruding from the umbilicus was considered diagnostic of umbilical granuloma in an otherwise healthy baby.

A copy of written instructions on self-application of table salt twice a day for about 30 minutes each time for up to three days was delivered to each caregiver electronically via email or WhatsApp®. The self-explanatory method is the one described in one of the references cited.<sup>[16]</sup> The caregivers were told to adhere to the instructions and to provide photographs of the umbilicus before application and after completion of the treatment. The infants were given follow-up appointments for one week after diagnosis.

Resolution was defined as complete disappearance of the red-fleshy tissue and its replacement by a healthy scar tissue and/or normal skin. The confirmation of the resolution of the umbilical granuloma was made by a direct physical examination or by examination of photographs of the umbilicus received by the second author from the caregiver.

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## Results

The male to female ratio was 3: 1. The median gestational age at delivery was 39 completed weeks. Two infants were born preterm at 34 and 36 completed weeks respectively. Five infants (62.5%) were delivered by Caesarean Section while the rest were delivered vaginally. The median birth weight was 3kg. Six infants (75%) were exclusively breastfed while two (25%) were fed exclusively with infant formula.

All infants had 7.1% Chlorhexidine di-gluconate gel (supplied by the hospital) applied to the cord daily. One

mother also reported the application of methyl-alcohol bought over the counter after seven days of applying the chlorhexidine gel until the cord dropped. Another mother reported applying methyl-alcohol to the umbilical granuloma before presenting at the hospital. One (12.5%) infant had umbilical venous catheterization but no instrumentation of the cord was carried out in the seven other infants. The cord dropped at three weeks of age for the only infant for which this information was available.

One infant (12.5%) who had risk factors for neonatal sepsis at birth had antibiotics (Cefuroxime and Amikacin) which were stopped by 72 hours of life when the sepsis was ruled out by a negative blood culture and absence of symptoms. Five infants (62.5%) had neonatal jaundice with three of them requiring phototherapy while none required exchange blood transfusion. There were no other clinically significant conditions diagnosed in the infants. The median age at which a diagnosis of umbilical granuloma was made was six weeks.

All eight infants diagnosed with umbilical granuloma were treated with table salt under the direction of the second author and all of them had complete resolution demonstrated at the end of the treatment period.

The median number of days after commencement of treatment when resolution was demonstrated via photographs received from the caregiver was three days with a range of 1 to 5 days. Physical confirmation of resolution at a clinic visit was done at a median interval of 28 days (4 weeks) after commencement of treatment with a range of 1 to 21 weeks.

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## Discussion

Treatment with table salt resulted in resolution of umbilical granuloma in all eight infants seen in our study within seven days with no recurrence or adverse events reported.

Our study outcome of resolution of all cases of umbilical granuloma and no significant adverse events has been equally demonstrated in multiple studies using table salt.<sup>11,12,18</sup> In one report, four patients (8.3%) who were initially diagnosed as having umbilical granuloma, but failed to respond to table salt treatment had histopathology of the lesions done which revealed umbilical polyps.<sup>13</sup> Similarly, another study reported that four patients (1.8%) who were initially treated for umbilical granuloma turned out to have umbilical polyps.<sup>17</sup> Two publications reporting a significantly lower response to table salt did not report if histopathology of the unresponsive lesions were done.<sup>6,19</sup>

The technique adopted in our study of a home based, caregiver administered, twice daily application for three days or more had earlier been used in multiple studies.<sup>6,9,12,13,17</sup> The duration of therapy and the techniques adopted in other studies include twice daily application held with sterile gauze and adhesive tape for 30 minutes done twice a day for at least three days<sup>6,13,17,19</sup>, once

daily applications lasting two hours and 24 hours without any covering that was repeated till resolution was confirmed,<sup>18</sup> once daily application for 24hrs held in place by surgical adhesive tape.<sup>11</sup>

One study used a technique of clinic based, provider administered, single application of table salt under occlusion with adhesive tape for 24 hours.<sup>11</sup> The advantage of this latter technique is the consistency that comes with a provider administered therapy, the short duration of treatment and demonstrated short time to resolution, while the drawback is the need for a trained provider. Even though we recognize that consistency and adherence to a treatment protocol is likely to be better with this later report none of these earlier studies recorded failure of therapy due to non-adherence or inconsistent administration.

While we provided instruction in written pamphlet on the use of table salt, other reports gave verbal instruction to the caregiver and trained clients on the use of the therapy. There was no significant difference in the rate of complete resolution between our study and other studies that gave verbal instructions to caregivers.

We made our diagnosis virtually via WhatsApp® for two (25%) and by physical examination for six (75%) patients respectively, while confirmation of resolution was done virtually for five (62.5%) – two via WhatsApp®, three via email- and by physical examination for six (75%) patients respectively in our study. Other studies did not report any diagnosis or confirmation of resolution made virtually. While there was a delay in our physically confirming the resolution via a clinic/ immunization visit there were no adverse events associated with this delay in any of the clients. The natural history of untreated umbilical granuloma has not been the subject of any study in the past and we are reassured by the recognition that no significant adverse events have been associated with the presence of umbilical granuloma.<sup>1,11</sup> The delay in physically confirming the resolution of the granuloma till the time of next scheduled appointment or routine immunization will be worthy of consideration. It is also important to note that the presence of the COVID -19 pandemic- with a high mortality rate- may have inadvertently promoted our use of electronic platforms to virtually confirm resolution of the umbilical granuloma as parents would have been less keen on exposing themselves and their children to the higher risk of COVID 19 by visiting the hospital.

The outcome of 100% (8/8) resolution from our study is different from the result of 80% (32/40) from a study that adopted a similar technique as ours. Resolution was reported as 55% (22/40) at end of first week and 25% (10/40) at the end of third week. The treatment and subsequent outcome for the 20% (8/40) with no response was not stated in the study.<sup>6</sup>

The exact time to resolution is certainly different and most likely shorter than the time to physical confirmation of resolution in some of our study participants whose resolution were confirmed at their next clinic appointment or immunization visit. The median time to

virtual confirmation of resolution in our study was 3 days which is longer than 24 hours reported for physical confirmation in a previous study,<sup>11,18</sup> but similar to 2-5 days reported for physical confirmation by other studies.<sup>7,14</sup> Other studies only evaluated for resolution one week after commencement of therapy.<sup>12,13,17,19</sup> The median time to physical confirmation of resolution in our study was four weeks after diagnosis. This is similar to three weeks (10/40) to confirmation of resolution reported in another study<sup>6</sup>.

It is worthy of note however, that studies that report resolutions occurring within 24 hours involved applying the salt and leaving it in contact with the umbilical granuloma for the entire 24 hours.<sup>11,18</sup> We could therefore speculate that a longer table salt – umbilical granuloma contact time could result in faster resolution. Other factors that might be responsible for the variation between resolution times could be the size of the umbilical granuloma and the amount of salt applied but further studies need to be done to confirm this.

The use of common salt for the treatment of umbilical granulomas was first recorded over 50 years ago, but despite multiple reports after that, no adverse event was reported in any of the previous studies.<sup>5,9,11,18</sup>

No other therapeutic interventions for umbilical granulomas were required in our study participants as there was complete resolution of the lesions with table salt therapy. The difficulty of access and reported adverse events associated with the use of other interventions make them less attractive first choices in our facility. The principal adverse events previously reported for other interventions include burns to the periumbilical skin, discolorations of clothing and beddings, requirement for trained personnel and cost<sup>1,11,18</sup>. None of these events were reported in our study.

As a retrospective study we relied on available medical records, including photographs taken by caregivers and shared with the second author. The standard of adherence to the treatment regimen and timely demonstration of resolution which were adopted for the clinical trial studies could not be assured in our study<sup>18,19</sup>. The treatment in our study was self-administered and the verification of caregiver's report of resolution immediately or within one week after application was achieved only for infants whose caregivers provided photographs or visited the clinic as scheduled within one week. We do not have complete data on the exact time to resolution, the time interval between diagnosis and commencement of treatment in all the children except when the mothers provided this via still photographs at commencement, during and after treatment. While it is possible, it is very unlikely that mothers will delay commencement of treatment as table salt is readily available and mothers usually address infant concerns promptly.

## Conclusion

Despite its limitations, our study demonstrated uni-

formly good outcome with table salt therapy for umbilical granuloma among the infants studied. We therefore recommend that consideration should be given to the adoption of table salt as a candidate treatment of umbilical granulomas.

#### Author's Contributions

Dr Ojeola Tioluwanimi - Intellectual content literature search, data acquisition, data analysis, manuscript preparation, manuscript editing and manuscript review

Dr Oyeyemi Bashir - Intellectual content, concept, design, literature search, manuscript preparation, manuscript editing and manuscript review

**Conflict of interest:** None

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