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UP TO DATE MANAGEMENT OF UMBILICAL CORD GRANUOLMAS

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Abstract

Umbilical granulomas are of common occurrence in the neonatal period. The diagnosis is triggered by the observation of umbilical discharge and the identification of a red granulation tissue mass at the base of the umbilical stump. The clinicians should practice extra vigilance to differentiate the benign Umbilical Granuloma from other serious diagnoses involving the remnants of the umbilical cord including Patent Urachus and Persistent Vitello Intestinal Duct. Identification of urine or stool within the discharge material should alert the Paediatrician or Paediatric Surgeon to such diagnoses. Other differential diagnoses include Umbilical Polyp, Urachal Duct Cyst, Haemangiomas and Pyogenic Granuloma. The association of an infected Umbilical Granuloma with Omphalitis and Necrotizing Fasciitis has persuaded many Neonatologist and Paediatric Surgeons to abandon the expectant management approach. However, there is as yet, no universally agreed management strategy for Umbilical Granulomas. Active management options include topical application of Common Salt, Silver Nitrate, Copper Sulphate, Alcohol Wipes, topical Corticosteroids, topical Doxycycline Powder, Silk ligation, surgical excision, Cryocautery, and Electrocautery. The conclusion of our extensive research is that the majority of the interventions are effective in treating Umbilical Granulomas. However, Common Salt application appears to be the most practical, simple and effective option, with no reported complications.

Keywords: Umbilical Granuloma, Salt Therapy, Silver Nitrate, Cryocautery.

Introduction:

Umbilical Granulomas are one of the commonest anomalies of the umbilicus in the newborn[1]. They present as a small granulation tissue at the base of the umbilicus[2], (**Figure 1)**. The granulation tissue consists predominantly of fibroblasts, abundant small vessels, and endothelial and inflammatory cells [2]. The overgrowth of the granulation tissue is a consequence of incomplete epithelialization of the umbilical ring[2]. There are no many credible epidemiological studies to define the incidence and prevalence of Umbilical Granulomas[3]. Güngör Karagüze et al[3] reported a prevalence rate of 1:500 which is concluded by Assi AN[4] et all in study from Thailand in 2004. Umbilical Granulomas are predominantly found in male babies with no plausible scientific or theoretical explanation[2]. Proximal clamping of the cord, in comparison to distal clamping, is reported by Al Siny et al[5] to decrease the occurrence of Umbilical Granulomas in a study involving 100 babies. The size of the Umbilical Granuloma varies from 3 - 10 mm in diameter[2]. Characteristically, the granuloma is noted by the carers after separation of the umbilical cord[6,7]. The typical first observation is discharge from umbilicus[8]. The moist, painless, red lump tissue protruding from the base of the umbilical stump is subsequently apparent on closer inspection. The active treatment of Umbilical Granulomas is supported by the various reports of infected Umbilical Granuloma leading to Omphalitis and Necrotizing Fasciitis, which are both serious complications[9-10]. Various treatment modalities has been in common practice, though which management modality is the best is not clear as yet. This topic aims to highlight an up to date management strategies.

Figure 1 Umbilical Granuloma

Diagnosis:

Although the diagnosis of Umbilical Granuloma is mainly clinical, the main differential diagnosis, Umbilical Polyp, may pose a challenge[11]. The assessment of an experienced clinician is adequate, most of the time, to diagnose an Umbilical Granuloma clinically and exclude other diagnoses including Umbilical Polyp, Patent Urachus, Persistent Vitello Intestinal Duct, Urachal Duct Cyst and Pyogenic Granuloma. The appearance of the Umbilical Granuloma is an oval or round shape, pink lump. The lump is located at the base of the umbilicus and thus will only appear after separation of the umbilical cord. The small, painless, pink to red and moist lump is usually 3-10 mm in size[12]. However, untreated Umbilical Granulomas may grow bigger in size. The discharge is usually clear but may be blood stained[12], is of mucus consistency and odourless. The periumbilical skin is not inflamed[12].

Management Options:

A. **Expectant Conservative Approach:** Some clinician are still in favour of "wait and see approach"[13]. In general, the conservative approach consisting of clinical follow-up without any medication or intervention has been in decline. The conservative approach requires careful selection of families to ensure early identification of potential complications, stemming from an

infected Umbilical Granuloma. These include Omphalitis and Necrotizing Fasciitis. Although these potentially fatal complications are extremely rare, the safety profile of various interventions justifies active management. Moreover, there are no credible studies of spontaneous regression rate of the untreated granulomas. There is also the potential of further growth of the Umbilical Granuloma, which may reduce or abolish the efficacy of simple treatment.

B. **Common Salt Application:** Topical Common Salt has been evaluated in many Randomized Control Trials. It has been found to be effective in treating Umbilical Granuloma, with no side effects. The efficacy ranges from 93-100%[14, 15, 16,17,18,19]. Furthermore, Common Salt was reported to be highly effective (>90%) in many observational studies involving over 1000 babies[20, 21, 22]. The high level of success is even more appealing due to the low cost and absence of complications[20, 21, 22]. The duration and frequency of Common Salt applications vary across the globe but they seem to yield similar success rates. Kavthekar et al[16] quasi-**RCT** compared the effect of short application time (10 minutes twice per day for 7 days) with long application time (30 minutes twice per day for 7 days) of Common Salt to infants with Umbilical Granuloma. They evaluated 30 babies in each arm after one and three weeks. Total cure rate was 93.33% in infants from the first group and 96.66% from the second group. There were no reported side effects and no recurrence. The researchers concluded that Common Salt could be used for just 10 minutes twice daily for seven days for infants with Umbilical Granuloma. Furthermore, Haftu et al[21], Farhat et al[22], Bagadia et al[23], Faranoush et al[15], and Saleh et al[24] demonstrated a 100% cure rate of Common Salt treatment with no adverse effect and no recurrence in the subsequent follow-up. The standard method is to show the parents the first application in the clinic. The umbilicus is cleaned with a cotton ball soaked in clean warm water before salt application. A pinch of salt is then applied over the Umbilical Granuloma and covered with gauze or non-adhesive surgical tape for 20-30 minutes. It may help to tuck the gauze into the baby's nappy to keep it in place. The salt is then cleansed using cotton ball soaked in clean warm water. The procedure is repeated at home by parents 2-3 times per day until the granuloma is separated. Small clot like shrunken tissue is expected to be easily scraped off during gentle cleansing. Bagadia et all[23] left the Common Salt for 24 hours following the first application. They achieved 100% cure rate with one application with no reported complications. Farhat A et all[22] demonstrated same cure rate with single application for 24 hours. Janyoungsak et al[25] used Hypertonic NaCl (30%) solution as an alternative to Common Salt with a success rate of 98.1%.

C. **Silver Nitrate Topical Application**: Topical Silver Nitrate is still a popular practice despite its high cost. The success rates leading to complete resolution of the Umbilical Granuloma is > 90%[1,26]. However, repeated applications are usually required in many babies which increases the cost and the risk of complications. Ogawa et al[26] reported a success rate of 90% after 3 weeks of Silver Nitrate compared to 53% after only one week of applications. The reports of Silver Ni-

trate applications leading to burns of the periumbilical surrounding skin are discouraging the clinicians from its use[28,29]. Many clinicians use Petroleum Jelly or liquid Paraffin to protect the surrounding skin during Silver Nitrate Application.

D. **Copper Sulphate Topical Applications**: Fiaz M.et all[14] and Annapurna et al[29] demonstrated a 95-100% cure rate after single topical application of Copper Sulphate to the Umbilical Granuloma. However, the risk of periumbilical skin burns is similar to that of Silver Nitrate.

E. **Steroids Topical Application**: Clobetasol Propionate 0.05% or Betamethasone Valerate 0.12% have been used in the treatment of Umbilical Granuloma with a reported success rate of over 90% after one-three weeks of 2-3 times applications[30]. However, there is a potential for systemic absorption, skin hypopigmentation, atrophy as well as local infection. The costs and safety profile favour Common Salt application.

F. **Doxycycline Powder Topical Application:** Sprinkling 20-50 grams of Doxycycline Powder over the whole surface of the Umbilical Granuloma is followed by covering the area with dressing for 24 hours. The application is repeated for 5 days. The reported success rates varies between 82-90%[10].

G. **Ethanol Wipes Topical Application:** Cleaning the Umbilical Granuloma with Ethanol wipes twice daily for 7 days yielded variable success rate of 34-80%[15].

H. **Ligation of the Umbilical Granuloma Pedicle**: This approach is suitable only for pedunculated Umbilical Granulomas. The double ligature technique using 3-0 silk sutures usually results in separation of the granuloma in 7-14 days. Ligation is contraindicated in large sessile Umbilical Granulomas with a wide base and is not possible if the granuloma is not pedunculated. Catastrophic complication may result, if the ligature is applied to Vitello Intestinal Duct is misdiagnosed as Umbilical Granuloma[31].

I. **Other Interventions**: Surgical excision, Cryocautery and Electrocautery are reserved for large granulomas and when topical applications are not successful[32]. Cryocautery needs cryogenic Nitrous Oxide as a refrigerant and sophisticated equipment. On the other hand, Electrocautery is associated with foul-smelling discharge in many infants which could be confused with local infection. Cryocautery was more effective than Electrocautery as quoted by Ravisha Srinivas Jois et al[1] Both Cryocautery and Electrocautery carry the potential risk of burns to the surrounding skin.

Conclusions: Topical Common Salt application appears to be the most practical, simple and effective treatment for Umbilical Granulomas, with no reported complications. Surgical excision, Cryocautery and Electrocautery should be reserved for large Umbilical Granulomas when topical applications are not successful.

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