

# The Effects of Topical Pure Vaseline and Olive Oil on the Efficacy of Phototherapy in Term Neonates

## TERM YENİDOĞANLARDA TOPIKAL PÜR VAZELİN VE ZEYTİNYAĞI UYGULAMASININ FOTOTERAPİ ÜZERİNE OLAN ETKİLERİ

Emel ÇALIKOĞLU\*, E. Esra ÖNAL\*\*, Füsun K. UYSAL\*\*\*, Uğur DILMEN\*\*\*\*, İ. Safa KAYA\*\*\*\*

\* Yrd.Doç.Dr., Fatih Üniversitesi Tıp Fakültesi Dermatoloji AD,  
\*\* Dr., Fatih Üniversitesi Tıp Fakültesi Neonatoloji Departmanı, Pediatri Uzmanı,  
\*\*\* Yrd.Doç., Fatih Üniversitesi Tıp Fakültesi Neonatoloji Departmanı,  
\*\*\*\* Prof.Dr., Fatih Üniversitesi Tıp Fakültesi Neonatoloji Departmanı, ANKARA

### Summary

**Purpose:** Conventional phototherapy may increase transepidermal water loss in full term infants. Interaction of different emollients with UV light transmission is well known but there is no controlled study evaluating the effects of emollient topics or vegetable oils on the efficacy of phototherapy in newborns. In this study, we aimed to investigate the effects of topical application of olive oil or liquid pure vaseline on the efficacy of phototherapy in term infants with nonpathologic jaundice.

**Material and Methods:** Forty-five otherwise healthy term newborns with unconjugated hyperbilirubinemia were studied and divided into three groups randomly. Pure vaseline was applied to 15 babies (Group 1) and olive oil was applied to 13 babies (Group 2). The control group was consisting of 17 babies (Group 3). All patients were treated by conventional phototherapy. Nurses applied topical emollients every eight hours to whole skin surface of the babies during phototherapy. Plasma levels of unconjugated bilirubin were checked every 12 hours routinely at the same hour of the day. The mean of total phototherapy time and rate of bilirubin fall were calculated for each patient.

**Results:** The mean of total phototherapy time and rate of bilirubin fall were not significantly different between three groups (p: 0.306 and p: 0495 respectively).

**Conclusion:** Our results suggest that pure vaseline and olive oil, as topical emollients do not decrease the efficacy of phototherapy in term newborns. Our results encourage to use these emollients in newborns without any side effect during phototherapy.

**Key Words:** Jaundice, Emollients, Phototherapy, Newborn

T Klin J Dermatol 2002, 12:127-130

### Özet

**Amaç:** Konvansiyonel fototerapi term yenidoğanlarda transepidermal sıvı kaybını artırabilir. UV ışını absorpsiyonu ile çeşitli emolyentlerin etkileşimi iyi bilinmektedir ancak yenidoğanlarda topikal vazelin ve zeytinyağı uygulamasının fototerapi üzerine olan etkilerini değerlendiren herhangi bir kontrollü çalışma yoktur. Bu araştırmada, topikal zeytinyağı ve sıvı pür vazelinin patolojik sarılığı olmayan term yenidoğanlarda fototerapi üzerindeki etkilerini araştırmayı amaçladık.

**Gereç ve Yöntem:** Ankonjüge hiperbilirubinemisi olan 45 sağlıklı term yenidoğan randomize olarak üç gruba ayrıldı. Sıvı pür vazelin 15 (1. Grup) ve zeytinyağı ise 13 bebeğe uygulandı (2. Grup). Kontrol grubu 17 bebekten oluşuyordu (3. Grup). Hastaların tümü konvansiyonel fototerapi tedavisi aldı. Pür vazelin ve zeytinyağı, hemşireler tarafından her sekiz saatte bir bebeklerin tüm deri yüzeyine fototerapi uygulaması süresince uygulandı. Gruplarda plazma ankonjüge ve konjüge bilirubin seviyeleri her gün aynı saatlerde olmak üzere 12 saatte bir kontrol edildi. Ortalama fototerapi zamanı ve bilirubin düşme hızları hesaplandı.

**Bulgular:** Gruplar arasında ortalama fototerapi zamanı ve bilirubin düşme hızları açısından istatistiksel olarak anlamlı bir fark saptanmadı (Sırasıyla, p: 0.306 ve p: 0495).

**Sonuç:** Araştırmamızın sonuçları, sıvı pür vazelin ve zeytinyağı uygulamasının term yenidoğanlarda fototerapinin etkinliğini azaltmadığını ve term yenidoğanlarda bu emolyentlerin herhangi bir yan etki oluşturmadan fototerapi süresince uygulanabileceğini göstermektedir.

**Anahtar Kelimeler:** Sarılık, Emolyentler, Fototerapi, Yenidoğan

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Neonatal jaundice due to unconjugated hyperbilirubinemia is a common problem in neonates and known as a major cause of hospitalization

during this period (1). Phototherapy is currently the accepted method of treating neonatal jaundice, its clinical efficacy being confirmed in many studies

(2-5). No long-term side effects of phototherapy have been observed but, during treatment, side effects in the form of diarrhea, drowsiness and transient exanthemata may occur (6). Additionally, it is reported that conventional phototherapy in full term infants in open cribs increased transepidermal water loss (7). Application of emollient ointment decreases transepidermal water loss and the severity of dermatitis in infants (8,9). Vegetable oil, a natural and inexpensive product is recommended and widely used instead of topical emollients such as aquaphor in neonates in our country (10).

Interaction of different emollients with UV light transmission have been studied, some of them have showed that enhanced UV transmission, whereas some others decreased (11). There is no controlled study evaluating the effects of topical emollients or vegetable oils on the efficacy of phototherapy in newborns.

In this study, we aimed to investigate whether topical application of olive oil or liquid pure vaseline affects the efficacy of phototherapy in term infants with nonpathologic jaundice.

### Materials and Methods

We studied 60 newborns with unconjugated hyperbilirubinemia, which admitted to the neonatal intensive care unit during the three months of period at Fatih University Medical School. All subjects were term and healthy except unconjugated hyperbilirubinemia. The babies with any infection or disease causing hyperbilirubinemia such as glucose-6-phosphate dehydrogenase enzyme deficiency, blood group incompatibility were excluded from the study. Babies receiving some medications such as phenobarbital were also excluded.

Forty-five babies were evaluated according to including criteria and they were divided into three groups randomly. Pure vaseline was applied to 15 babies (Group 1) and olive oil was applied to 13 babies (Group 2). The control group consisted of 17 babies (Group 3). Nurses applied topical emollients every eight hours to whole skin surface of the babies during phototherapy.

All patients were treated by conventional phototherapy at Airshields® (USA) warmer using six halogen lamps (Osram®, GERMANY). Plasma levels of unconjugated bilirubin were checked every 12 hours routinely at the same hour of the day unless the patient's clinical status required another schedule. Serum total bilirubin levels were measured by the 2,5-dichlorophenyldiazonium tetrafluoroborate (DPD) method using Hitachi 902 otoanalyzer (Boehringer Mannheim®, GERMANY). The efficacy of phototherapy was evaluated by two parameters: total phototherapy duration (hr) and rate of bilirubin decrease (mg/hr) the babies.

Variance analysis was used for statistical comparisons.

### Results

The sex, gestational age, postnatal age and birth weight of the babies were similar in the groups ( $p>0.05$ ) (Table 1).

The mean total bilirubin level at admission (TBL) was not different between three groups (Table 2). The mean total phototherapy duration (TPD) and rate of bilirubin fall (RBF) were not significantly different between three groups ( $p=0.306$  and  $p=0.0495$  respectively) (Table 2).

**Table 1.** The demographic features of the subjects

	Group 1 (pure vaseline) n=15	Group 2 (olive oil) n=13	Group 3 (control) n=17	P value
Sex (M/F)	7/6	9/6	8/9	NS
Gestational age (week)	39.0 ± 1.0	39.0 ± 0.7	38.9 ± 0.8	NS
Birth weight (g)	3141 ± 396	3334 ± 400	3332 ± 244	NS
Postnatal age (day)	4.2 ± 1.7	4.4 ± 1.8	4.4 ± 1.6	NS

**Table 2.** The mean total bilirubin level (TBL), total phototherapy duration (TPD) and rate of bilirubin fall (RBF) values of three groups

	Group 1 (pure Vaseline) n=15	Group 2 (olive oil) n=13	Group 3 (control) n=17	P value
TBL (mg/dl)	18.8 ± 2.7	18.9 ± 2.5	20.8 ± 3.4	NS
TPD (hr)	33.73	36.13	41.79	NS
RBF(mg/h)	0.21	0.17	0.20	NS

No side effect of phototherapy was observed in infants in three groups.

### Discussion

We found that application of topical pure vaseline and olive oil did not decrease the efficacy of phototherapy in term infants with jaundice.

It is known that conventional phototherapy in full term infants in open cribs increased transepidermal water loss (TEWL) (7). Although the term babies have a well developed stratum corneum, percutaneous water loss as well as absorption problems also may be seen because of their wide body surface area and environmental factors such as occlusive clothing, elevated temperature and humidity (12,13,14). Although phototherapy is widely used in neonates, TEWL is not monitored adequately every time in term infants in our country. Application of topical emollients decreased TEWL in term and preterm babies, decreased the severity of dermatitis, and decreased the risk of sepsis in preterm babies (8,9,15). However it is not known whether topical ointment therapy has any effect on the efficacy of phototherapy in newborns.

This is the first study investigating the interaction of topical emollients with UV light transmission during phototherapy in newborns. Pure vaseline and olive oil were chosen as emollients because they were inexpensive, could be easily found, and had no known side-effects in newborns (10).

Emollients used for skin care, treatment of a disease or lubrication, before irradiation during the

course of phototherapy may significantly interfere with the transmission of UV light and may influence the outcome of the therapy. Gabard et al. studied the interaction of some commercially available emollients with UV light transmission in adults and found that some emollients containing urea decreased the transmission of UVB and white petrolatum slightly increased the UVA transmission (11,16). But there is no study investigating interaction of emollients with phototherapy light in newborns.

The efficacy of phototherapy depends on various factors such as types of lamps, the amount of skin exposed to phototherapy, the intensity of the light which were similar in the groups of this study. The cause of unconjugated hyperbilirubinemia also affects the rate of bilirubin fall and duration of phototherapy (17). So we did not include the babies with unconjugated hyperbilirubinemia due to hemolysis. We used the mean total phototherapy duration and mean rate of bilirubin fall as parameters of efficacy of phototherapy. The mean plasma total bilirubin levels at admission and the mean postnatal age of the babies were not significantly different between groups. Therefore, it is acceptable to compare of treatment efficacy by total phototherapy duration and rate of bilirubin fall.

In conclusion, possible interactions of topical emollients must be considered on the babies receiving phototherapy in neonatal intensive care unit. Our results suggest that pure vaseline and olive oil do not decrease the efficacy of phototherapy in term newborns and encourage the use of these emollients without any side effect during

phototherapy. Further studies for other topical emollients in order to increase the efficacy of phototherapy may be designed and also preterm babies must be evaluated.

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**Geliş Tarihi:** 24.12.2001

**Yazışma Adresi:** Dr.Emel ÇALIKOĞLU  
Fatih Üniversitesi Tıp Fakültesi  
Dermatoloji AD, ANKARA