AUTO-TRANSPLANTATION OF AMNION-CHORION MEMBRANE IN A BURNED PREGNANT PATIENT AT TERM

AUTO-TRANSPLANTATION DE MEMBRANE CHORIO-AMNIOTIQUE CHEZ UNE PATIENTE ENCEINTE À TERME BRÛLÉE

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SUMMARY. Burn in pregnancy represents a threat to the mother and the fetus. Burn care in pregnant women is not well codified. An aggressive treatment including oxygen supplementation, smart fluid resuscitation and early excision has been reported. Nevertheless, auto-transplantation of amnion-chorion membrane in a pregnant woman with burns has not been reported to date. We present our first case of auto-transplantation of fresh amnion-chorion membrane in a pregnant woman admitted to our department with 14% TBSA deep and superficial burns associated with inhalation injury. The chorion-amnion membrane harvested after caesarean section was used to cover the excised and autograft sites. Outcome was good and all wounds healed. The child was healthy also.

Keywords: amniotic membrane, pregnancy, burns, auto-transplantation

RÉSUMÉ. La brûlure au cours de la grossesse représente une menace pour la mère et le fœtus. La prise en charge de la brûlure chez la femme enceinte n’est pas encore bien codifiée. Un traitement agressif comprenant une oxygémentation, une réanimation hydro électrolytique adéquate et une excision précoce a été rapporté. Cependant, l’auto-transplantation de membrane chorio-amniotique prélevée chez la femme après accouchement n’a pas encore été rapportée. Nous présentons ici notre premier cas d’auto-transplantation de membrane chorio-amniotique fraîche chez une patiente enceinte admise pour une brûlure de 14% de surface cutanée, profonde et superficielle associée à des lésions d’inhalation. La membrane chorio-amniotique prélevée après accouchement par césarienne a été utilisée pour couvrir les lésions superficielles et les lésions plus profondes excisées et greffées. Les suites ont été favorables. Les lésions ont cicatrisé et le nouveau-né se portait bien.

Mots-clés : membrane amniotique, brûlure, grossesse, auto-transplantation

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**Introduction**

Pregnancy involves a state of multiple modifications, both physiologic and physical.\(^1,2\) Burns in pregnant women are rare.\(^3,4\)

Therefore, the treatment protocol is not well codified. Many centres documenting burns during pregnancy have reported the risk of fetal and maternal death.

These risks increase with factors such as total burned surface area, depth of the burns, associated inhalation injury, pre-existing medical conditions, and the term of the pregnancy.\(^1,5\)

An aggressive treatment including oxygen supplementation, smart fluid resuscitation, early excision and, in some cases, early delivery of the baby are advised.\(^5,7\)

In fact, early delivery either by vaginal route or by incisional caesarean may save the life of the fetus by keeping it out of the toxic environment of cytokines and other mediators linked to the inflammatory phase of burn injury.

Nevertheless, early excision has more implications, requiring temporary or definitive coverage to save the life of the pregnant patient. In limited resource settings, where no skin or organ bank exists, an excised surface without coverage may lead to infection, metabolic complications or death by multiple organ failure. Human amniotic membrane for the coverage of wounds and burns has been reported since the beginning of the past century, precisely by Davis in 1910\(^8\) and by Sabella in 1913.\(^9\)

Nevertheless, the mainstream use of this material is still not seen in African low and middle-income countries (LMICs).

Limitations come from social and cultural barriers, and the lack of legislation about organ donation. In addition to these factors, screening of donors for viral and bacterial clearance is dependent on budget and equipment that these countries do not always plan for in their health expenditure.

Many publications in the modern literature that mention the use of amnion-chorion membrane in burns come from developed countries and some middle-income countries.

Amnion-chorion membrane is rarely used in the fresh form, but more commonly in the cryopreserved and dehydrated forms.

To the best of our knowledge, the auto-transplantation of amnion-chorion membrane for burn coverage has not been reported previously.

We report our first case of use of auto-transplantation of amniotic membrane for the coverage of burns in a burned pregnant patient at term.

**Case report**

A 29-year-old woman with no medical or social history, carrying a 38-week pregnancy, was admitted to our Burns and Plastic Department with fire burns following a home propane leakage accident.

The woman presented with deep dermal burns on the face, forearms, ankles and forefeet (Fig. 1), estimated to cover 14% TBSA.

Inhalation injury was suspected based on the history of the accident and clinical findings (wheezing, burned nostril hairs).

The woman was admitted to the ICU with nebulization and high oxygen therapy by oxygen mask. Her wounds were dressed with gauze and Vaseline tulles.

We planned for an early excision of the burns and autologous skin graft.

After consultation with the obstetrics board, we decided on early delivery of the fetus by caesarean section in the same stage. Consent was obtained from the woman to use amnion-chorion membrane for coverage of the burns. At 35 hours post admission, a caesarean section was carried out and a healthy baby was delivered.

We excised the deep burns over the right hand and wrist with immediate autologous split thickness skin graft.

The amnion-chorion membrane was used to cover the skin graft and the remaining more superficial burns that needed no excision (Fig. 2). The burns healed without any infectious or metabolic complication after six months follow-up (Fig. 3). The hospital stay was 17 days.

The baby and the mother were doing well at discharge.
Fig. 1 - Burns at admission. A) On the face. B-D) On the upper limb. C) On the feet.
Discussion

Human amnion-chorion membrane is thought to bring growth factors and cytokines into the wound site and reduce bacterial count. It has also shown properties that reduce inflammation, pain and scarring.

The membrane positively impacts the wound healing process as well.10-14

Apart from being a biological protective dressing, human amnion-chorion membrane has been shown to provide a biological matrix that supports cell proliferation and tissue regeneration.

A variety of growth factors that play a critical role in the healing of wounds have been linked to human amnion-chorion membrane. These growth factors include epidermal growth factor (EGF), basic fibroblast growth factor (bFGF), keratinocyte growth factor (KGF), transforming growth factor (TGF-α and -β), hepatocyte growth factor (HGF), and nerve growth factor (NGF). In addition, low immunogenicity is linked to human amnion-chorion membrane.8-15

Amnion-chorion membrane is safely harvested
Fig. 3 - Follow-up after six months. A) Scars on the upper limbs, volar side. B) Scars on the feet. C) Scars on the upper limb, dorsal side. D) Good hand movements, showing pliability of the skin.
from the placenta and chorionic sac after the delivery of a fetus. In countries where organ banks exist, amnion-chorion membrane is harvested and preserved under strict procedures.  

Mainstream use of amnion-chorion membrane in African LMICs is still not the rule. In this case, amnion-chorion membrane was obtained from a caesarean delivery.

Here, the caesarean delivery was motivated by the fact that the pregnancy was at term, and the patient was to be given anaesthesia for burns excision.

We chose and obtained consent from the patient to use the same anaesthesia to deliver the baby.

We harvested fresh amnion-chorion membrane to cover the skin graft and the non-excised burns. There was no need for supplementary viral or bacterial clearance in the patient.

In a study published by Prasann and Singh, pregnant burn patients delivered their babies by either vaginal or caesarean routes. However, there was no mention of the use of chorion-amnion membrane for auto-transplantation in these patients.

One patient suffering 60% TBSA burns, in this series that included pregnant women, died. Nevertheless, these authors concluded that excision of extended burns was not advisable in low-income countries because of the non-availability of skin substitutes.

Some other series in which early delivery of the baby was reported did not mention auto-transplantation of amnion-chorion membrane to cover burns in pregnant women.

The use of amnion-chorion membrane to cover the burns and the graft contributed to quick wound healing, and reduced the number of dressings required.

Consequently, the comfort of the patient increased in the face of this psychological and physical trauma that is burn injury.

### Conclusion

We used amnion-chorion membrane harvested after delivery to dress the burns of a burned pregnant patient at term.

The procedure was simple and cost effective. The patient healed with no complications.

Auto-transplantation of amnion-chorion membrane must be envisioned in full term pregnant patients with burns.

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**BIBLIOGRAPHY**