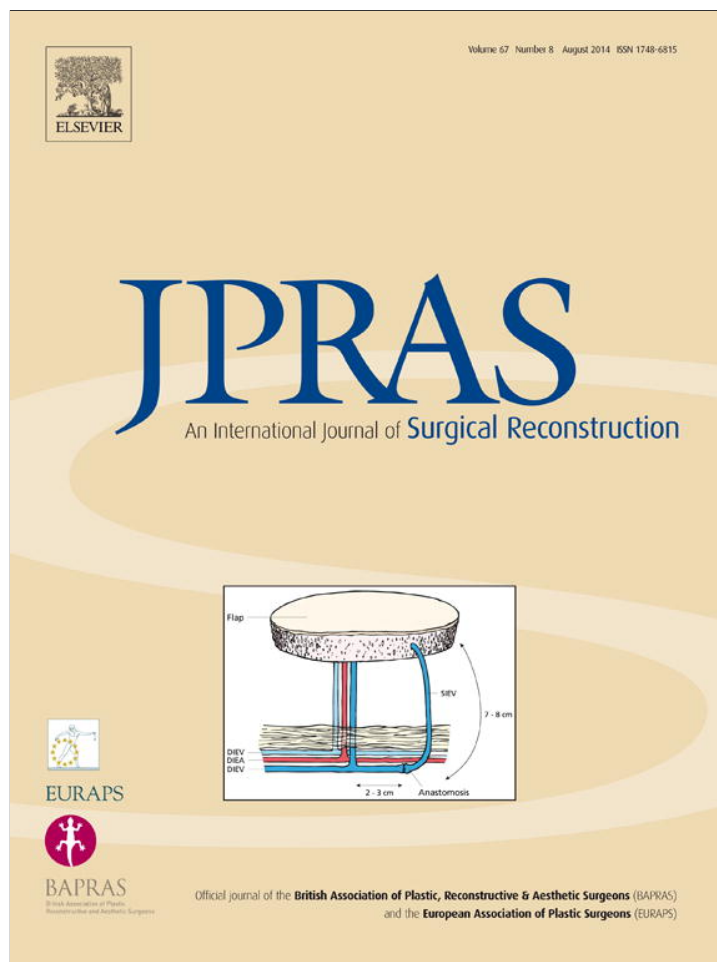




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Hydrosurgery, a new therapeutic perspective in early care of giant congenital nevi: A preliminary series of four cases[☆]



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KEYWORDS

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Summary *Background:* Congenital melanocytic nevi are present at birth or may appear in the first weeks of life. Small and medium-size lesions are relatively common, affecting approximately 1% of newborns; large or giant melanocytic nevi occur in 1/20,000–1/500,000 births. The main concern raised by these lesions is their potential risk of degeneration which is strongly size-dependent and estimated in the literature between 0% and 40% over a lifetime. Although multiple treatment modalities have been described, to date there is no consensus regarding their optimal management.

Patients and methods: Four neonates (three females and one male) presenting giant congenital nevi with a mean age 12 days (7–24 days) were referred to our Plastic Surgery department for treatment from 2012 to 2013. All patients underwent an alternative dermabrasion procedure with the innovative use of hydrosurgery. All procedures were performed under general anaesthesia by the same senior operator (Dr. B. Bayet).

Results: The mean operating time was significantly reduced compared to conventional techniques. No complications were observed in the postoperative course. Good final results were obtained in three patients after a mean follow-up of respectively 11, 8 and 4 months. The first operated neonate showed a complete recurrence of pigmentation of the treated areas after 6 months.

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Conclusions: The need for early treatment in giant congenital nevi is admitted by all.

Hydrosurgery is easy to use and allows to achieve a selective and symmetric resection with an obvious cleavage plane and clean-cut borders. Furthermore, this procedure has convinced us with its speed of use, ensuring significant time saving, and therefore less morbidity for the neonate. Aesthetic results as well as recurrence rate may be comparable to conventional techniques. However, regular follow-up to detect any malignancy is necessary.

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Introduction

Congenital melanocytic nevi are present at birth or may appear in the first weeks of life. These lesions result from dysregulation of migration, proliferation and differentiation of melanocytes during embryogenesis.¹

They are classified according to their adult size expectancy, which can be estimated from the initial location by multiplying the observed size by a factor of 2 in the head and neck area and a factor of 3 for the other regions.² Usually, a four-level scale is considered to grade them, small being <1.5 cm, medium between 1.5 and 20 cm, large between 20 and 40 cm and finally giant if it is >40 cm.³ Other classifications are based on the initial diameter of the lesion, the percentage of the body surface area affected or the feasibility of a one-stage excision, all of which can be useful when supported. The large or giant melanocytic nevi occur in 1/20,000–1/500,000 births.⁴ The main concern raised by these lesions is their potential risk of degeneration which is strongly 'size-dependent' and estimated in the literature between 0% and 40% over a lifetime.⁵ However, other considerations such as their impact on the social life of the patient, resulting scars and arising psychological effects are also taken into account.⁶ The need for an early treatment in giant congenital nevi is admitted by all. Although multiple treatment modalities have been described (surgery, laser, dermabrasion, curettage and chemical peels), to date there is no consensus regarding their optimal management.^{7–10}

We report here our experience through four cases of neonates presenting giant congenital nevi for which we proposed, as an alternative to classic dermabrasion and curettage, the innovative use of hydrosurgery, so far undocumented.

Patients and methods (Table 1)

Four neonates (three females and one male) presenting giant congenital nevi with a mean age of 12 days (7–24 days) were referred for treatment to our Plastic Surgery department from 2012 to 2013 (Figures 1–4). The extent of the lesions was evaluated by taking as a reference the palm of the child, equivalent to 1% of the body surface.¹¹ All patients underwent a complementary assessment by brain magnetic resonance imaging (MRI) and the presence of meningeal and parenchymal brain lesions compatible with melanin deposits was highlighted in patient 1, suggesting the diagnosis of neurocutaneous melanosis. Early surgical management was planned under general anaesthesia in the 3 first weeks of life, with a mean age of 12 days (7–24 days). In patient 1, we started with classical curettage of the lesion in the back. The entire surface showing proliferative nodules was classically excised and the specimen was submitted to the pathology department for examination. The curette however was felt too aggressive in some areas, and therefore we decided to move to the hydrosurgery to complete the treatment on the trunk, the limbs and satellite facial lesions. Sterile saline solution was heated at body temperature to prevent cooling of the child. Immediate results in these areas were more than satisfactory and hydrosurgery allowed a significant time saving. An additional procedure was performed during the third week of life, in order to improve the results at the periphery of the main lesion and to remove the remaining satellite lesions. Unfortunately, this attempt was much less successful than the first, pigmentation being removed with great difficulty. The operations in the three following neonates were performed by the same surgical team in a standardised way using hydrosurgery alone. Control of haemostasis was ensured by simple compression and selective

Table 1 Hydro-surgery in early care of giant congenital nevi: patients and results.

Patient number	Sexe	Age	Percentage of body surface area affected	Satellite lesions	Brain melanin deposit (MRI)	Number of procedure	Follow-up	Repigmentation	Hypertrophic scarring
1	Femelle	7 days	40%	+++	+	2	20 months	+++	–
2	Femelle	24 days	20%	–	–	1	11 months	–	+
3	Femelle	8 days	15%	–	–	1	8 months	–	–
4	Male	7 days	20%	+	–	1	4 months	–	–

+++ : Very noticeable, ++ : Noticeable, + : Moderately noticeable, – : None.



A



B

Figure 1 Patient number 1. A: Preoperative view showing a congenital giant nevus affecting the entire back with proliferative nodules. B: Postoperative clinical photography depicting the complete repigmentation of the treated areas and numerous new satellite nevi.

electrocoagulation. All neonates tolerated the intervention well and no general or local complications were recorded. Mepitel-type silicone dressing coated with a Biophadine-type moisturizer was immediately applied after surgery over all treated areas. The postoperative course proceeded without any adverse event at the paediatric intensive care; dressing changes were performed every 2 days, under light sedation with sevoflurane. Thereafter, dressings were done every day, under simple analgesia in the paediatric ward; morphine was added in the baby bottle half an hour before treatment during the first days. Learning care was gradually taught to the parents and children were discharged home. The patients were monitored weekly during the first month, then monthly during the next 3 months, and quarterly until the end of the first year for patients 1 and 2. During consultations, a complete skin examination was carried out, jointly with our co-working dermatologists, in order to both assess the evolution of the cosmetic result and to detect any change in the main or the remaining satellite lesions.

Results and discussion

Unfortunately, in the first operated neonate a complete repigmentation of the treated areas was observed and new satellite nevi appeared within 6 months after treatment (Figure 1). Given the presence of melanin deposits along the leptomeninges, we thought this child was more likely to have deep population of immature melanocytes responsible for recurrence. On the neurological level, the patient remained asymptomatic: no developmental delay was noted.

Results are much more encouraging in patients 2 to 4 with only slight pigmentation beyond the treated area after respectively 11 and 4 months of close follow-up in patients 3 and 4 (Figures 3 and 4) and hypertrophic scarring on the left flank in patient 2 (Figure 2).

The main concern with congenital melanocytic nevi is the risk of degeneration into malignant melanoma, but the exact incidence and timing of malignant transformation remain controversial, varying according to the literature from 0% to 40%. Nevertheless, in recent articles the risk of cutaneous or extra-cutaneous melanoma is far below the prognostic rates previously advanced, with an average incidence of 1% to a lifetime for nevi of small and medium size and 5% for larger lesions.¹² This risk is however not constant throughout life and melanomas seem more likely to occur during childhood in patients with large lesions involving the midline and associated with satellite nevi.

Several methods of therapeutic management are currently used and the choice of treatment must, in each case, be based on three objectives: to reduce the risk of degeneration, to get a satisfactory cosmetic result and to maintain proper function. Although prophylactic full-thickness surgical excision associated with long-term monitoring is recommended, it is not always feasible. Multiple procedures are associated with substantial morbidity, unaesthetic sequelae and do not completely eliminate the risk of degeneration.^{13,14}

Actually, it appears that a number of malignant lesions can develop not only in the area of excision but also away from it. Melanocytes observed in large congenital nevi



Figure 2 Patient number 2. A: Preoperative view showing a giant congenital nevus involving the anterior abdominal wall below the umbilicus, the left flank and the lumbar region. B: Intraoperative view showing the use of the hydrosurgery system allowing selective tangential hydrodissection. C: Postoperative view 11 months later: hypertrophic scarring on the left flank.



Figure 3 Patient number 3. A: Patient showing a pigmented lesion on the left thoracic wall. B: Postoperative view: a slight pigmentation appeared beyond the treated area a few months later.

actually occupy the deep dermis and subcutaneous tissue, but may also infiltrate a fascia or underlying muscle.¹² In addition, they persist under the integuments during the first years of life, with among them a population of melanocytic cells which are prone to spontaneous mutations.¹⁵ When conventional full-thickness excision of giant congenital nevus is not achievable, a cosmetic benefit can be attained using alternative techniques called 'surface procedures' which include curettage, dermabrasion, chemical peels or laser treatment. These techniques when used during the immediate neonatal period are able to largely eliminate the melanocytes present in the superficial dermis reducing excess of pigmentation and decreasing the total number of cells with a high potential degeneration rate.¹⁶ Unfortunately, re-pigmentation phenomena may be observed and the risk of malignant transformation cannot be eliminated regardless of the technique used.¹⁷ Therefore, it seems essential in the management of giant congenital nevi to promote a treatment providing on the one hand the best cosmetic results with the lowest morbidity rate and in the other hand a significant risk reduction of malignant transformation. The VERSAJET™ Hydro-surgery System* (Smith & Nephew, Memphis, TN, USA) system has been used for a long time in chronic wounds and burns debridement.¹⁸ Sterile saline solution is propelled at high speed parallel to the surface of the wound and is coupled to a local depression which draws off the

target tissue (Venturi-effect). The hand piece is applied to the treatment area and allows efficient and selective tangential hydrodissection. Used in giant congenital nevus, this technique, as curettage, is based on the observation made by Moss who described the existence of a temporary physiological cleavage plane between the superficial dermis, where pigmented nevus cells are mostly present, and the deep dermis where they are less numerous.¹⁹ Prompt treatment of the lesion should be considered to ensure the best results even if recurrence may be more related to the presence of immature melanocytes in deeper layers. The use of hydrosurgery in neonates with congenital melanocytic nevi requires the use of a 45° angulation and an 8 mm stream aperture hand piece (REF 50637), as it provides the best control. At the start of procedure, an initial power setting of 3–4 should be applied. The power setting may be increased gradually as needed depending on tissue resistance.

We believe that the goal of treatment should be to remove as much pigmentation as possible without reaching subcutaneous tissues to not delay wound healing.

Compared to existing techniques, hydrosurgery has convinced us with its ease of use, speed of implementation as well as its selectivity and uniformity in the resection, leaving a well-defined cleavage plane whose final appearance, after healing, is more homogeneous.

Conclusion

Nowadays, treating a child with congenital melanocytic nevi remains challenging and the optimal approach to these lesions is still controversial. Surgery is the treatment of choice for lesions that may be fully excised, combining different plastic surgery techniques. However, it does not completely eliminate the malignancy risk and is related to a substantial morbidity. Assuming that the elimination of all nevus cells is not an achievable goal, our approach focuses on cosmetic and psychological concerns resulting from the presence of large congenital melanocytic lesions.

Given the ease and speed of execution of hydrosurgery, it is from our point of view, a simple and elegant alternative in the treatment of giant melanocytic nevi for which complete excision cannot be considered. To obtain satisfactory lasting results, the therapeutic action should be executed as soon as possible, ideally within 3 weeks of life. Recurrences as well as malignant transformations may occur due to the presence of immature melanocytes in subcutaneous tissue, fascia or underlying muscle which is unpredictable and unfortunately cannot be highlighted. Management of giant congenital nevi should then be foremost multidisciplinary and individualized, taking into account not only the risk of malignant degeneration but also cosmetic and psychological impact resulting from the presence of those lesions or scars resulting from their removal. Although hydrosurgery has the potential to become a weapon of choice for the immediate surgical treatment of large congenital melanocytic nevi, this interesting technical tool does not eliminate the imperative need to impose on patients a very close follow-up with a systematic clinical examination to detect and treat aggressively any early or late occurrence of malignancy.



Figure 4 Patient number 4. A: Seven-day-old neonate showing a congenital melanocytic nevus involving the lower parts of the abdominal wall and back both, buttocks and the left thigh. B: Postoperative photography 3 months later: slight pigmentation beyond the treated area on the left thigh.

Conflict of interest/funding

None.

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