

Skin Oncoplasties: Is Z-Plasty A Technique of Choice In Situation of Limited Resources? Case of Burkina Faso.

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Abstract

Background: In developing countries, the long delays in consultation lead to a delay in diagnosis and management of the skin tumours. The lesions are often large and brings the problem of skin coverage after their resections. Several reconstruction techniques allow skin coverage. The objective of this study is to describe the place of Z-plasty in the surgical treatment of skin cancers in Ouagadougou.

Patients and methods: It was a two-centre, retrospective, descriptive study on Z-plasty in skin cancers. It included patients who underwent surgery between January 1st, 2013 and March 30th, 2021 in Ouagadougou. Scar quality and healing time in Z-plasty were compared with those of secondary healing.

Results: In 8 years and 3 months, 171 skin cancers were identified. The mean time to consultation was 13.6 months. The average size of the tumours was 9 cm. A Z-plasty was performed in 42 cases, being 58.3% of the patients operated on. The average healing time was 15 days. It was four and a half times shorter in Z-plasty than in secondary healing. Ischaemic necrosis of the Z-corner was noted in 7 cases. The recurrence rate in Z-plasty and secondary healing was 7.1% and 9.1% respectively. Hypertrophic or keloidal scars were noticed in 7 cases and hypochromia in 2 cases.

Conclusion: Z-plasty is a technique of choice for skin coverage after large resections in surgical oncology. It reduces the healing time and the cost of postoperative care without increasing the risk of tumour recurrence.

Introduction

Skin cancers are a public health problem. Their incidence has risen sharply in recent years worldwide, making them the third most common type of cancer [1]. One in three new cancers in Switzerland is a skin cancer [2]. They include basal cell carcinomas, squamous cell carcinomas, melanomas and cutaneous sarcomas [3–5]. Surgery plays an important role in the management of skin cancers [3, 6, 7]. The modalities of surgical treatment depend on the location, histological type, size of the lesion and the patient's condition [6, 7]. In the West, the diagnosis of skin tumours is made at an early stage, with small lesions allowing resection and suturing in majority of cases [8–10]. The situation is quite different in developing countries, particularly in Burkina Faso [3, 7]. Indeed, the long delays in consultation lead to a delay in diagnosis and management [7]. The lesions are often large and brings the problem of skin coverage after their resections. Several reconstruction techniques allow skin coverage [10, 11]. Skin grafts require a good basement and good hygiene conditions. Secondary healing involves numerous wounds dressings over several months. The mobilisation of fascia-muscle flaps requires technical skills and a trained team [7, 10–13]. Z-plasty, a technique which has being used for long in plastic surgery, is less complex to perform and is therefore an alternative for skin coverage after large tumour resections [11, 13, 14]. In Burkina Faso, Z-plasty has been used for several years now, following skin cancers large resections [6]. The objective of this study is to describe its indications, technique and results in Ouagadougou.

Patients And Methods

This is a two-centre, retrospective, descriptive study on Z-plasty in skin cancer, carried out between January 1st, 2013 and March 30th, 2021 in Ouagadougou. The surgical departments of the Yalgado Ouédraogo Teaching Hospital and the Schiphra Protestant Hospital were used as study sites. The study population was represented by all patients with a skin tumour who had undergone excision. Patients who had a Z-plasty after skin cancer surgery and were followed until healing were included in this study. Our data sources were the referral forms, the operating theatre register, and the medical records of the surgical department of the Yalgado Ouédraogo Teaching Hospital and the Schiphra Protestant Hospital. The data was collected using a data collection form. We took into account variables such as age, sex of patients, topography and size of tumours, histological type, closure technique after tumour resection and complications. Data analysis was done by EPI info software.

Results

In 8 years 3 months, 171 skin cancers were identified. The average age of the patients was 48.5 years with extremes of 15 and 75 years (Table I). Sixty percent of the patients were men. The average time to consultation was 13.6 months. The cancers were located on the thorax in 24% of cases (Table I). The average size of the tumours was 9 cm, with a size greater than 5 cm in 63.3% of cases (Table I). Cutaneous carcinomas accounted for 60%, melanomas for 25% and sarcomas for 15% of cases (Table I). Surgery was performed on 72 patients (42%). After lumpectomy or compartmental surgery, direct suture, skin detachment, and offloading incision allowed skin closure in 14 cases (19.4%), three cases (4.2%), and two cases (2.8%) respectively. Secondary wound healing was the option in 11 cases (15.3%) with an average healing time of 67 days with extremes of 52 and 126 days. On average, two dressings were made per week.

Reconstructive surgery was performed for carcinomas and sarcomas. A Z-plasty was performed in 42 cases, being 58.3% of the patients (Figs. 1, 2, 3, 4). The indication was a wide resection with an impossibility of direct suture. We only performed this plasty when the resection was at least macroscopically complete during surgery. The lateral margins of resection varied between 1.5 and 3 cm with an average of 2.4 cm in carcinomas (34 cases), 3 to 5 cm in sarcomas (7 cases). The length of the mobilised skin flaps was less than twice their width in all cases (Fig. 1, 2). The average healing time was 15 days with extremes of 12 and 33 days. Partial flap necrosis was noticed in 2 cases. Ischaemic necrosis of the "Z" angles was noticed in 5 cases (Fig. 3). Healing was achieved by excision of the necrotic tissue and further wound dressing.

Histology of the surgical specimen referred to pathology noted an R0 resection in 40/42 cases. Recurrence was observed in 3 cases.

The time required for secondary healing compared to Z-plasty was 4.5 times longer. The recurrence rate in Z-plasty and secondary healing was 7.1% and 9.1% respectively. Hypertrophic or keloidal scars were

noticed in 7 cases (Fig. 4) and hypochromia in 2 cases (Fig. 1).

Discussion

Skin cancers are increasing in incidence and are ranked third among all cancers [1, 15]. They are among the most common in the West [1, 15, 16]. In Australia, skin cancers have the highest incidence in the world with 33.6 cases / 100,000 population [16]. This high frequency in the West contrasts with their relative rarity in Africa. Indeed, skin cancers represent 7.5–11.8% of all cancers in Africa [4, 17]. Skin cancers, although regularly diagnosed in Burkina Faso, remain relatively rare compared to the European and American literature [7]. Despite their low frequency, these cancers present difficulties in their management. Indeed, their diagnosis is late due to long delays in consultation (13.6 months) and consequently tumour sizes are large with an average of 9 cm. This contrasts with the small tumour sizes noted by some authors in developed countries, which range from 0.4 cm to 2 cm [8, 10]. When the tumour is small, direct excision-suture is possible [18]. However, when the tumour is large, the resection leaves large defects that can be filled by several procedures [16, 19]. There are many indications for skin coverage, including post-traumatic skin defects, surgical excision for benign or malignant tumours, burns, and deformities [18]. Skin coverage after large tumour resections remain a real challenge for healing. Direct suturing helped by the intrinsic elasticity and plasticity of the skin is no more possible [18, 19]. The prerequisite for direct suturing is an early diagnosis with small resections. This is far from being the case in our series where the average size of the tumours was 9 cm. Several methods of skin coverage must therefore be used [18, 19]. Pedicle flaps are used to fill in surgical defects [19]. Local skin or musculocutaneous T- and H-shaped flaps are used to treat skin defects in the forehead [20]. Rhombic flaps, which are local transposition flaps, are used to fill defects after skin cancer surgery in the head and neck region [19]. Z-plasty is the most commonly used technique in precarious situations and has solved 58.3% of the skin coverage problems of the trunk and limbs in our series. In addition to the size of the tumour, the indications for Z-plasty in our series were the absence of superinfection of the tumour, the absence of bony relief making it difficult to mobilise the flaps, and the localisation of the tumour in an area where flaps can be mobilised. The size of the mobilised flaps remains function of the width of the surgical wound [18, 20]. However, for vitality of the flaps in the Z-plasty that are free, non-pediculised flaps, we followed the 2:1 rule, meaning the length should not be more than twice the width.

In a situation of limited resources, diagnostic delays, poor results and inaccessibility of chemotherapy, and the absence of radiotherapy give surgery a central place in the management of skin cancers. In case of large tumour sizes, the surgeon has the choice between directed healing and mobilisation of skin flaps or skin grafts [19]. Z-plasty was performed in 58.3% of our patients with tumours size between 5 and 20 cm. Z-plasty allowed skin closure after large skin resections. Unlike vascularised flaps, it does not require a great technical skill, is fast to perform and accessible to most surgeons. The average healing time after Z-plasty was 15 days. Min and col. in their series found 29 days [13]. In our series, this healing time is 4 times longer in secondary healing. In addition, with an average of two wound dressings per week, it makes the total number of wound dressings to be 5 times higher in secondary wound healing than in Z-plasty.

The flap does not increase the recurrence rate, nor does it interfere with other adjuvant oncological treatments [19, 20]. The advantages of Z-plasty over secondary wound healing and skin grafting are short healing times and low postoperative care costs. Z-plasty thus seems to us to be a technique of choice in precarious situations for low-income countries such as Burkina Faso. In our series, the Z-plasty proved to be practicable, simple to perform and with very few complications. The healing time was short compared to secondary healing. It therefore reduces the number of dressings, trips to health centres, and the cost of care. These skin oncoplasties also reduce the rate of recurrence because of the large resections they allow the surgeon to perform without having to worry about compromising skin closure.

Conclusion

Cutaneous oncoplastic surgery is in its onset in Burkina Faso. Z-plasty allows skin coverage while optimising healing. It reduces the healing time compared to secondary healing and consequently the number of wound dressings and trips to health centres, in short the cost of care. It also reduces recurrence rates because of the large resections it allows without the surgeon having to worry about compromising skin closure. In addition to sarcomas and cutaneous carcinomas, it should also be used for rare skin cancers such as melanomas. The promotion of oncoplasty, a larger cohort and sufficient hindsight would allow a better appreciation of its advantages in the precarious situation of Burkina Faso.

Declarations

Ethics approval and consent to participate

Access to the information sources was authorised by the heads of departments and directors of the hospitals concerned. The informations collected were kept confidential and anonymous.

Consent for publication : We have obtained the consent of each patient for the use of the data, especially the illustrative photos

Availability of data and materials : The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests : The authors declare that they have no competing interests" in this section.

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Concept and design: NZ, NLMO

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Critical revision of the manuscript for important intellectual content: LSCY, AT, PN

All authors approved the final version of this publication.

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Authors' information (optional)

Conflicts of interest: None

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Tables

Table I : Clinico-pathological characteristics of patients who had a Z-plasty n=42

	Number	Percentage %
Age of patients (years)		
[15–25[	9	21
[25–50[	23	56
[50–75]	10	23
Total	42	100
Topography of cancers		
Thorax	10	24
Abdomen	8	19
Buttock	9	1
Thigh	7	17
Leg	6	14
Arm	2	5
Total	42	100
Tumour size (cm)		
[0–5[	4	10
[5–10[	17	40
[10–15[	11	25
[15–20[	6	15
More than 20	4	10
Histological type		
Darier and Ferrand Dermato-fibrosarcoma	2	4
Fibrosarcoma	4	10
Squamous cell carcinoma	29	72
Basal cell carcinoma	5	12
Undifferentiated sarcoma	2	4

Figures



Figure 1

Z-plasty and multifocal carcinoma of the back in an albino A: Bifocal squamous cell carcinoma of the back B: Surgical wounds after tumour resection C: Mobilization of skin flaps D: Appearance after Z-plasty E: Scar appearance one year after Z-plasty surgery



Figure 2

Z-plasty and skin sarcoma of the buttock A: Ulcerative burgeoning skin tumour of the right buttock B: Operative wound after tumour resection C: Mobilisation of skin flaps D: Appearance after Z-plasty allowing skin coverage of the wound

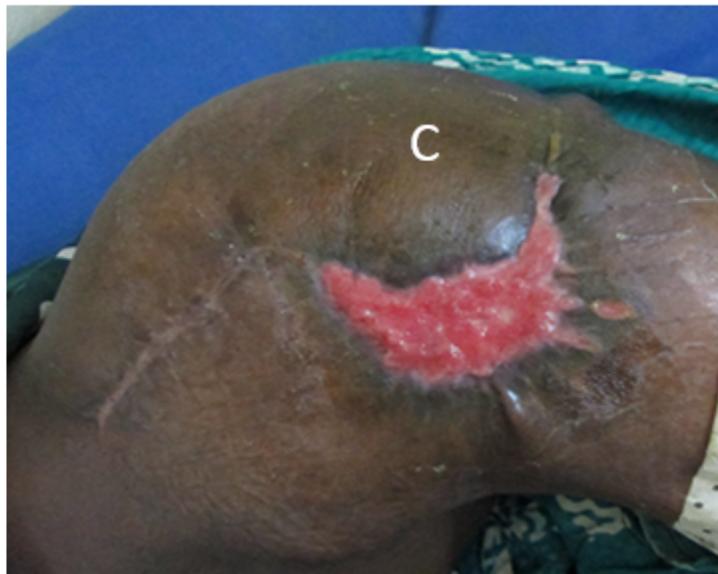
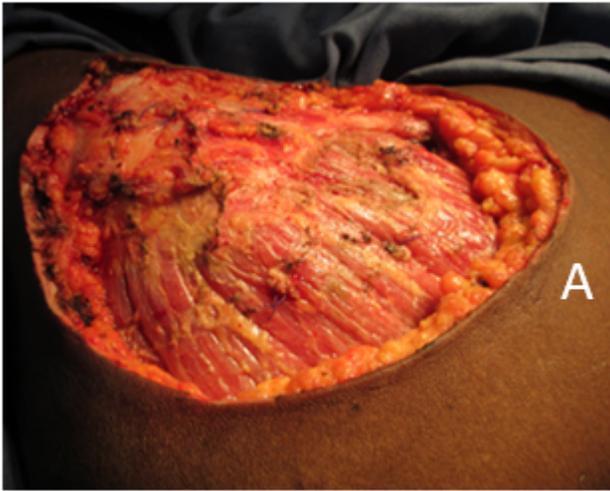


Figure 3

Corner necrosis after Z-plasty treated with rapture and directed healing A : Buttock wound after lumpectomy B : Z-plasty C : Necrotic Z-angle appearance after necrosectomy



Figure 4

Z-plasty complicated by keloids A: Cutaneous sarcoma B: Wound after resection C: Z-plasty D: Keloid healing