

# The Use of Unripe Pawpaw for Wound Bed Preparation Following Radiation-Induced Sacral Ulcer: A Case Report and Review of Literature

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## Abstract

Radiation wounds are very difficult to manage due to poor vascular status, excessive matrix metalloproteinases, and abnormal myofibroblast function. Such wound beds do not adequately support conventional resurfacing as do nonradiate beds. We present a 46-year-old female with a sacral radiation ulcer, which had earlier failed to support flap cover on two instances after bed preparation with conventional honey dressing and negative pressure dressing, but was subsequently successfully managed with unripe pawpaw wound bed preparation. A re-elevation of the right gluteal myocutaneous flap proved successful and satisfactory. The finding may have resulted from both enzymatic properties of unripe pawpaw and its ability to break the biofilms and to locally supply the ascorbic acid necessary for collagen synthesis and granulation tissue formation.

**Keywords:** Case report, radiation wounds, unripe pawpaw, wound bed preparation

## INTRODUCTION

The use of radiation in the treatment of cancers often results in the development of different kinds of complications including chronic non-healing cutaneous wounds.<sup>[1]</sup> Such wounds are very challenging to manage, resulting in wound burdens. The major challenge with radiation wounds is injury to blood vessels, which decreases angiogenesis and causes excessive production of matrix metalloproteinases, abnormal myofibroblasts, impaired collagen quality, and reduced cellularity.<sup>[2,3]</sup>

Wound bed preparation and wound cover with either split-thickness skin grafting or flaps have been characterized with a higher failure rate compared to non-irradiated wound beds.<sup>[4]</sup> The need to develop a more effective wound preparation protocol for irradiated wound beds, therefore, arises. This is to reduce the length of stay in the hospital and their attendant economic and facility stretch effects.<sup>[5]</sup>

We used unripe pawpaw to prepare a radiation-induced sacral wound bed, in which other modalities of dressing earlier employed were without success. This option of dressing

has been tried in other forms of wounds with significant success. This prompted the choice of unripe pawpaw dressing informed by its ability to encourage granulation tissue formation.<sup>[6]</sup>

## CASE REPORT

We present a 46-year-old female who was managed for a 5-month history of a sacral wound, which was noticed after 8 weeks of chemoradiation for cervical malignancy. She also had a defunctioning colostomy for frozen pelvis with complete intestinal obstruction and rectovesical fistula. The wound did not show signs of healing prior to referral

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and thereafter [Figure 1]. It was associated with moderate seropurulent wound discharge and initial low-grade fever. She is not a known diabetic and screened non-reactive to retroviral disease. She also had normal serum albumin values. Hematocrit was normal at presentation though she had been transfused prior to referral by the gynecologists.

The wound bed was prepared with initial surgical debridement and subsequent dressing with honey and negative pressure wound dressing for 4 weeks. Antibiotics were given based on sensitivity till culture showed bacterial clearance. Thereafter, she had wound excision and left gluteal myocutaneous rotation flap. She had two units of blood transfused intraoperatively and was placed on parenteral antibiotics. However, there was complete wound breakdown by postoperative day six with seropurulent discharge. The wound floor showed extensive slough. Honey dressing was then recommenced and another wound excision and right gluteal rotation flap were done after 6 weeks of initial surgery. This also failed leading to resort to unripe pawpaw dressing. Pawpaw was locally sourced and used fresh. It was prepared with antiseptic washing, peeling, and grating. It was applied directly on the wound bed after toileting with normal saline and dressing repeated on an alternate day basis [Figure 2]. After 6 weeks of the second flap, the wound bed had shown healthy granulation tissue. Then, the right gluteal rotation flap was re-elevated and inset as previously over a redovac drain. There was 100% flap survival and consolidation. The patient was satisfactorily discharged after 8 weeks of the 3<sup>rd</sup> flap surgery [Figure 3]. She gave consent to series of clinical photographs and obliged their use for academic publications.

## DISCUSSION

Pawpaw is cheap and readily available in Nigeria, being the leading producer in the continent.<sup>[7]</sup> There are a few studies showing the effectiveness of unripe pawpaw in escharolysis.<sup>[6,8]</sup> It has also shown some promising results in wound bed preparation in a yet-to-be published research in our center. However, such studies excluded radiation wounds due to their inherent healing difficulties.<sup>[9]</sup> Pawpaw is known to contain enzymes that are effective in wound debridement, as well as other components that are able to break biofilms and can also locally supply Vitamin C to facilitate collagen synthesis/granulation tissue formation.<sup>[6]</sup> In the index case, progressive slough formation and recurrent infection were a major challenge encountered in the initial management. This is usually common in radiation wounds because of the poor vascular status of the irradiated bed. Minor trauma to the tissues during surgical debridement also progresses into further slough formation. A non-surgical method that will obviate this trauma is preferred. Several non-surgical options such as hydrogel membrane and dermis-derived multipotent cells, among many others, have been used with varied results.<sup>[8]</sup> Most of these are not readily available or affordable to the patients in a resource-poor setting where we practice. A readily affordable and available option is the use of unripe



**Figure 1:** Postirradiation ulcer



**Figure 2:** Grated pawpaw applied to the ulcer



**Figure 3:** Eight weeks post flap cover

pawpaw. It is technically very easy to employ. We also did not observe any complication in the index patient, rather an impressive outcome. Flap cover was a stable and sensate cover that fulfilled the patient's expectation. This also provided

improved quality of life for the patient, which is a very essential component of the management of malignancies.<sup>[10]</sup>

Many months of frustration with flap failure following a combination of conventional honey dressing and negative pressure dressing were ultimately brought to an end. The innate ability of unripe pawpaw through its enzymatic properties to bring about an atraumatic separation of sloughs from viable bed favors a more rapid bed readiness for cover and may have contributed to this success. A prospective study of radiation wound bed preparation using unripe papaya is therefore recommended. This would help establish the strength or otherwise of this finding.

The use of unripe pawpaw for wound bed preparation is not yet a common practice in Nigeria. Available literature shows that despite its efficacy being well established in a scientific journal in a work authored by a Nigerian researcher, nearly four decades ago, it is only in animal models that a published work has subsequently been carried out.<sup>[11,12]</sup> In other climes, especially in India, unripe pawpaw has been employed in different types of wounds.<sup>[6,8]</sup> It has been especially successful in diabetic wounds, but remains uncommon in radiation-induced wounds.<sup>[13,14]</sup> The Indians who are the world's leading producer are understandably at the forefront and its use.<sup>[15]</sup> Nigeria being the leading producer in Africa should also play a role in promoting the place of pawpaw in wound care in the continent.<sup>[7]</sup>

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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