The Use of Papaya on Pressure Ulcers

A natural alternative.

In developing countries where medications and medical supplies are often in short supply or too expensive for most patients, nurses and other providers have adopted innovative and cost-effective alternatives to standard treatments. One example is the use of the fruit of the papaya tree (*Carica papaya*) to treat pressure ulcers. Nurses in Jamaica with years of clinical experience attest to its effectiveness, as both a debriding agent and a healing one. Yet there is surprisingly little documentation in the literature to support the use of papaya in managing pressure ulcers.

Also known as decubitus ulcers, bedsores, or pressure sores, pressure ulcers were described in medical texts as early as the 16th century. Before antibiotics, they caused high rates of morbidity and mortality. Slow to heal and easily infected when necrotic, pressure ulcers can be life threatening without proper treatment.

A nurse’s primary concern with pressure ulcers is prevention, although they do occur even with proper nursing care. Therefore, secondary concerns are to keep them from growing and becoming infected. Nurses and other providers have used several methods to treat or prevent ulcers, including periodically turning the immobilized patient, relieving pressure when possible, applying various topical agents, and administering prescribed antibiotics. This article describes a project in Kingston, Jamaica, by a group of RNs who wanted to learn more about the use of papaya fruit to treat pressure ulcers.

**Properties of Papaya**

A tropical plant believed to have originated in southern Mexico and Central America, *C. papaya* is now cultivated in tropical and subtropical regions worldwide. It’s a bushy tree 4 m to 8 m in height with a hollow trunk, large palmate leaves, and oblong fruits that hang from a stem and contain many pepper-corn-sized, edible seeds. The fruits are usually picked in a mature, green state and allowed to ripen. When ripe, the flesh is juicy, sweet, bright orange or pinkish, and melonlike in flavor. The stems, leaves, and fruits contain copious amounts of latex.

Papaya has been studied from a pharmacologic perspective. Green papaya is rich in two enzymes that have very strong digestive properties: papain and chymopapain. Papain, the enzyme used in commercial meat tenderizers, has the ability to dissolve dead tissue without damaging living cells. Accuzyme (Healthpoint, Fort Worth, Texas), a debriding ointment that contains papain and urea, is available by prescription in the United States to debride necrotic tissue and liquefy slough in a variety of acute and chronic lesions, including pressure ulcers. Each gram of Accuzyme contains papain, $8.3 \times 10^5$ USP units, and urea, 100 mg. Urea stimulates the digestive potency of papain. Cross-reactivity between papain and latex has been described, suggesting that patients who exhibit an allergic reaction to latex may have a similar reaction to papain. Physicians have also used chymopapain to aid in the healing and recovery of surgical wounds. (Chymopapain

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has other clinical uses, such as the treatment of lumbar disc herniation. As the fruit ripens, papain
and chymopapain dissipate; neither is present in the ripe fruit.

Carpaine, an alkaloid compound, is also found in green papaya and has been shown to have
antibacterial properties. In laboratory tests, extracts from the epicarp (skin), endocarp (flesh), and seeds
of both ripe and unripe papaya showed in vitro antibacterial activity against several microorgan-
isms, including Bacillus cereus, Pseudomonas aeruginosa, Shigella flexneri, Staphylococcus
aureus, and Escherichia coli.

Papaya also has fibrinolytic properties, which help to remove slough from wounds. There may
also be a proteolytic effect on bacteria, resulting from the production of a coagulum that immobi-
lizes microorganisms and protects the host against bacterial infection.

Research conducted at São Paulo University Hospital in Brazil showed that papain in a visceral
irrigation for patients with severe infection led to “considerable reduction of purulent secretion” after
72 hours of treatment. In another Brazilian study, papain was applied directly to the planar ulcers
of patients with leprosy. This treatment, combined with health education, led to faster healing com-
pared with other methods and to greater treatment adherence.

In the book Where Women Have No Doctor: A Health Guide for Women, Burns and colleagues
describe the following home treatment for pressure ulcers: “Soak a sterile cloth or piece of gauze in the
‘milk’ that comes from the trunk or fruit of a papaya plant. Pack this into the sore. Repeat three
times a day.” Based on their experiences in Belize, Arvigo and Balick reported that sliced fruit or
crushed papaya seeds applied to wounds, cuts, and infections assisted with healing.

PROJECT METHODS AND FINDINGS

Using a 15-item questionnaire, interviews were conducted with nine nurses who were chosen through a
snowball-sampling approach. (In snowball sampling, researchers identify a participant who meets
the criteria for inclusion in a study then ask the participant to recommend other participants who also
meet the criteria.) Only nurses who had used papaya to treat pressure ulcers and who were
known by other nurses to have used it were included in the project. The participants had
worked with patients with pressure ulcers for peri-
ods ranging from one month to 20 years and included junior staff nurses, nurse managers, senior
public health nurses, directors of nursing, a quality management coordinator, a patient coordinator,
and a recently retired nurse. The authors conducted
both face-to-face and telephone interviews that
focused on the recent use of papaya to treat pressure
ulcers; selecting and preparing the fruit; applying
the prepared fruit to the ulcers; the changes seen in
the ulcers after applying papaya; documenting the
use of papaya; and the general experience of the
nurses who used papaya to treat patients with pres-
sure ulcers.

Recent use of papaya to treat pressure ulcers. In
Jamaican culture, liquid or powder preparations of
various local herbs, flowers, tree leaves, and fruits
like papaya have been used to treat a variety of condi-
tions, although these practices are not always
accepted by the health care system. It’s unclear
when and by whom the papaya was introduced in
Jamaica to treat pressure ulcers, but some of the
participants remember it being used as a sloughing
agent as early as the 1970s, when standard slough-
ing agents were becoming both scarce and prohibi-
tively expensive. In the search for alternative
treatments that were as effective as standard med-
ical approaches, papaya was found to be both read-
ily available and relatively inexpensive.

The participants generally agreed that the deci-
sion to alternatively treat pressure ulcers was based
on the short supply of Eusol—a mixture of chlori-
nated lime and boric acid used for cleaning and
dressing wounds—and that, even when Eusol was
available, its rising cost and the large amount
required for debridement prohibited its use for
treating very large ulcers. The other popular slough-
ing agent, Elase—a fibrinolysin—desoxyribonuclease
preparation that dissolves fibrin in blood clots, no
longer commercially available in the United States
but still used in France—was also not cost effective
for use on these ulcers. Thus, a search was under-
taken for a less-expensive alternative.

Selecting and preparing papaya. Selecting
papaya was fairly consistent, varying in only a few
instances. All participants in the project used green
(unripe) fruit, which was prepared under clean condi-
tions for a chronic pressure ulcer. Typically, the
papaya was grated finely and blended into a paste
by the nurse, family members, or ancillary staff at
the health care facility. If sterile preparation was
required—for a surgical wound with delayed heal-
ing, for example—a nurse washed and sliced the
fruit with a sterile scalpel blade. The paste was pre-
pared fresh for each application. Participants stated
that in some instances the grated green fruit was
stored in the refrigerator and used the following
day, but not more than 24 hours later.

Applying papaya to pressure ulcers. Before
applying the papaya, the ulcers were cleaned with
normal saline solution, Eusol lotion, or soap and
water. (This approach is supported by Singhal and
colleagues, who emphasize the importance of clean-
ing or flushing the wound with normal saline before
applying an enzymatic agent.)
In most instances, green papaya was applied daily, either directly to the ulcer or on gauze, which was placed on the ulcer. A dry sterile gauze dressing was then used to cover the wound and keep the papaya in place. (Siegre and Maklebust endorse covering the wound with a dressing after the enzymatic debriding agent has been applied.) In a few cases, the papaya was applied twice a day for three days; in one case, it was applied on alternate days.

**Changes seen in the ulcers after applying papaya.** Participants reported that the slough was easily removed from the ulcer after the green papaya had been applied for about a week, at which time granulation tissue was evident. In some instances, the nurse continued to apply green papaya until the ulcers healed.

The participants reported that surgical debridement was necessary for patients with large, sloughing ulcers; applying papaya alone was insufficient. In those instances, green papaya was applied as a precursor to surgical debridement. After papaya was applied and as soon as the necrotic tissue began to soften and was easier to remove, the physician surgically debrided the ulcer.

When the healing process was very slow, papaya was used in conjunction with systemic antibiotics. In other cases, after the papaya was discontinued, topical lotions and ointments—such as Acriflavin (a dye used to disinfect wounds), Eusol, tetracycline cream or ointment, or Bactroban cream or ointment—were applied to the ulcer until it healed. (Singhal and colleagues describe a similar approach, in which a topical antibiotic is applied once the necrotic tissue separates from live tissue.)

**Documenting the use of papaya.** Nurses’ comments affirmed that, while papaya was an effective treatment, official documentation of its use was limited to nurses’ notes. Although many attending physicians sanctioned the use of papaya, they never wrote this in the patients’ case notes as a prescribed treatment. Their apparent reluctance to document this treatment may be attributed to the lack of scientific evidence of the efficacy of this application. Nurses identified the need for a formal written protocol on using papaya to treat pressure ulcers.

**General experience of the nurses.** All of the participants interviewed for this project were convinced that applying green papaya to pressure ulcers was effective. They reported that certain physicians, particularly surgeons, suggested using papaya to help heal ulcers, but that nurses often initiated this treatment, based on their clinical experience with its use and its positive effects. Participants reported that typical participants included those with cerebrovascular accidents, paraplegia, and delayed wound healing, as occurs with limb amputations in patients with diabetes. In the absence of a written protocol for papaya use, participants used their knowledge, expertise, and experiences to decide on the preparation and frequency of application. Some participants emphasized that papaya should always be prepared under sterile conditions, regardless of the type of wound.

**RECOMMENDATIONS**

In view of increasing health care costs and the difficulty in developing nations in obtaining up-to-date drugs and technology, finding alternatives is crucial. Therapies thought to be effective should be further investigated. Researching the efficacy of papaya to treat pressure ulcers could be extremely valuable in validating an inexpensive and effective treatment for countless patients around the world.

The authors recommend that, given the cross-reactivity of papain and latex, nurses and other providers assess patients for latex allergy before treating them with papaya. They also recommend further practice-based research and that, following such research, a formal protocol be written on the use of papaya to treat pressure ulcers. Finally, it’s recommended that all health care workers who use papaya to treat pressure ulcers document their practice in writing, which could provide valuable data for ongoing research.

**REFERENCES**