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Parallel pocket incision: Less invasive surgical intervention for the treatment of intractable pressure ulcer with wound edge undermining

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KEYWORDS
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Summary *Background:* The treatment of deep pressure ulcer with a wide wound edge undermining (pocket) is challenging, especially when conservative treatments are ineffective. As most patients with a pressure ulcer suffer from systemic comorbidities, invasive surgery cannot be performed on all patients, and less invasive treatment is required.
Methods: Less invasive surgical intervention to a deep pressure ulcer, parallel pocket incision (PPI), was performed on 10 patients with intractable pressure ulcers with a pocket formation. In PPI procedures, two parallel skin incisions were made to open up the deepest fold of the pocket and to preserve the skin overlying the pocket lesion; through the created incisions, the necrotic tissues around the deepest fold of the undermining could be easily removed, which facilitated spontaneous wound healing. Postoperative results and complications were evaluated.
Results: All PPI procedures were safely performed under local infiltration anesthesia without major postoperative complication; minor bleeding was seen intraoperatively in three patients, which could be easily controlled with electric cautery coagulation. Nine of 10 ulcers were cured after PPI, and one could not be followed up due to the patient's death non-related to the pressure ulcer. For the nine cured patients, the average time for cure was 14.9 weeks, and no recurrence was observed at postoperative 6 months.

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Conclusions: PPI is a simple, technically easy, and less invasive surgical intervention to an intractable pressure ulcer with a pocket, which can be safely performed under local infiltration anesthesia even on a patient with severe systemic comorbidities.

Pressure ulcer is a common disease among elderly patients who cannot ambulate by themselves. Wound edge undermining, which is commonly termed a "pocket" among Japanese wound-care professionals, is one of the most challenging complications of deep pressure ulcers.[1,2] Conservative therapies such as close skin monitoring, frequent positional change, and skin care play the most important roles in the prevention and treatment of pressure ulcers, but further surgical interventions are usually required in cases with a pocket lesion refractory to negative pressure wound therapy (NPWT). Complete resection of the lesion and reconstruction using a flap are considered the treatment of choice for an ulcer with a pocket.[3–5] As most elderly patients with pressure ulcer suffer from systemic comorbidities, invasive surgeries such as thorough debridement with or without a flap coverage cannot be applied in all cases.

Incision of the skin and the subcutaneous tissue to the pocket space is recommended to allow for the easier removal of the necrotic tissues around the deepest fold, and it facilitates spontaneous wound healing.[6,7] Conventional incision opens up the whole area of the pocket space with several linear incisions (Figure 1). Although conventional incision facilitates spontaneous wound healing with less invasiveness compared with flap reconstruction, the time required for complete wound closure is long, because the whole area of the pocket space has to be healed through granulation and epithelialization. To shorten the time for wound closure and to minimize invasiveness, we developed a new incision technique, parallel pocket incision (PPI), and evaluated the efficacy of the technique for intractable pressure ulcers with a pocket.

Patients and methods

PPI was performed on 10 patients with a deep pressure ulcer complicated with a pocket formation. All patients included in this study received conservative treatments including close skin monitoring, frequent positional change, skin care, and NPWT, and they suffered from an intractable ulcer with pocket formation refractory to conservative therapies. Patients' age ranged from 64 to 90 years (average, 81.4 years), and all patients could not ambulate by themselves, and they had severe systemic comorbidities that made it impossible to perform invasive surgeries such as thorough debridement of a pressure ulcer wound with or without flap coverage. Systemic comorbidities in the patients included cardiac infarction ($n = 7$), chronic heart failure ($n = 6$), chronic obstructive pulmonary disease ($n = 5$), hypertension ($n = 5$), myocardial infarction ($n = 3$), atrial fibrillation ($n = 2$), and diabetes mellitus ($n = 1$). Four patients were oldest-old (aged 85 years or older). Three patients underwent anticoagulation therapy. According to the National Pressure Ulcer Advisory Panel-European Pressure Ulcer Advisory Panel classification, three ulcers were under category III and seven ulcers were under category IV.[8] No ulcer with a direct bone exposure was seen. The pocket size ranged from 4 × 4 cm to 14 × 10 cm.

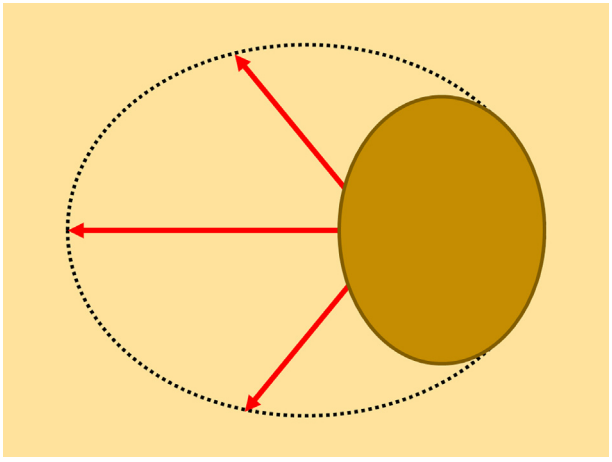

Figure 1 Conventional skin incision lines for a pressure ulcer with a wound edge undermining. The dotted lines indicate the area of undermining, and the red lines indicate incision lines.

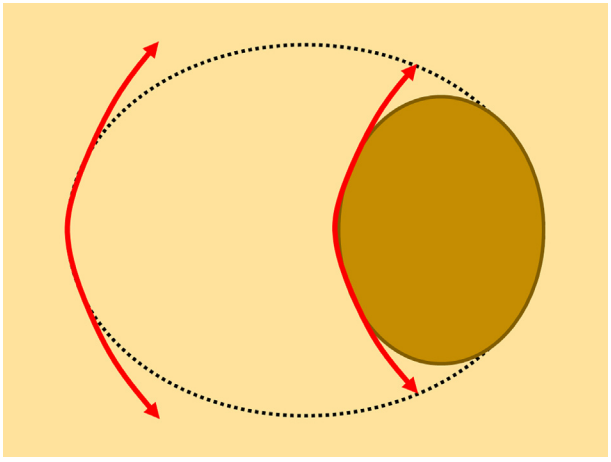

Figure 2 Parallel pocket incision lines for a pressure ulcer with a wound edge undermining. The dotted lines indicate the area of undermining, and the red lines indicate incision lines.