

Successful Management of Wound Dehiscence after Total Knee Arthroplasty by Topically Using Recombinant Basic Fibroblast Growth Factor

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Abstract

Wound complications are estimated to be affected in about 9% of TKA patients, which may increase the risk of deep periprosthetic infection and results in re-operation, joint fusion, or amputation. Here we have reported a female patient who suffered wound rupture due to early post-operation mobilization and weight-bearing. The wound dehiscence was successfully managed by applying recombinant basic fibroblast growth factor-2 and anti-infective treatment without removing prosthetic joint.

Keywords

Wound Dehiscence, Total Knee Arthroplasty, Recombinant Basic Fibroblast Growth Factor

1. Introduction

Early weight bearing is a high risk for wound rupture post-orthopedic surgery, especially after the lower extremity surgery. Here, we have reported a 66-year old female patient who was diagnosed as osteoarthritis for the right knee and has developed a total knee arthroplasty. She has also suffered wound rupture due to early post-operation mobilization and weight bearing. The wound dehiscence can be successfully managed by applying recombinant basic fibroblast growth factor-2 and anti-infective treatment without removing prosthetic joint. The work has been reported in line with the SCARE criteria [1].

2. Presentation of Case

Our case was reviewed and approved by Review Board of our institute. A

66-year-old Chinese female presented with a progressive pain on right knee for 2 years, which aggravated after 2 weeks and have shown difficulty in walking. The pain was localized to the right knee with limited range of motion at the knee joint. The patient did not show any other health related symptoms. The physical examination revealed significant effusion, moderate swelling of right knee, and a normal but painful range of motion and instability in both knees. Plain radiographs of the knees displayed severe degenerative changes with narrowing of the joint spaces in her right knee (**Figure 1(a)**, **Figure 1(b)**). Total knee arthroplasty was performed in right knee. A posterior stabilizer prosthesis was also implanted. There were no intraoperative complications and the alignment as well as stability of the prosthesis was satisfactory.

On postoperative day 19, the surgical wound on the right knee was partially dehiscence (**Figure 2(a)**) due to early weight bearing and passive maximum flexion for 80° of the knee joint. Under sterile technique, the wound was attended by debridement and followed by irrigation. During this process, we have taken discharges for examination multiple times. The first cultured results showed *Enterococcus faecium* whereas other secretions cultured of wound were negative. The patient did not show any symptoms or signs of active infection or loosening of the prosthesis three days post procedure. The laboratory data for white blood cell (WBC) count and a CRP level were normal. The antibiotics were given for 2 weeks based on drug sensitivity results. The implanted prosthesis was not removed based on the appearance of the wound and weak inflammatory response in a blood examination. The wound was re-sutured on postoperative day 22 and again on day 25 (**Figure 2(b)**). Even the debridement and dressing were performed every day, the healing of subcutaneous tissue and skin was poor. To promote wound healing, the patient was prescribed to use recombinant human basic fibroblast growth factor (bFGF) solution (SHUANGLU Pharmaceutical, Beijing, China) in wet dressing every other day following sterilizing the wound. On postoperative day 28, healthy granulation tissue was seen in the subcutaneous layer (**Figure 2(c)**). The patient continued dressing and the administration with rh-bFGF which resulted in gradual improvement in healing of skin. The wound completely closed on postoperative day 57 (**Figure 2(d)**). The latest follow up visit, 1.5 years postoperatively, has shown that patient had no infection, or instability of the prosthesis in her knee and her range of motion is 0° - 100°.

3. Discussion

Wound complications are estimated to be affected in about 9% of TKA patients, which may increase the risk of a deep periprosthetic infection and results in re-operation, joint fusion, or amputation [2]. About 71% of patients subsequently diagnosed with prosthetic joint infection had preceding superficial wound complications [3]. Surgical wound dehiscence significantly impacts on mortality and morbidity rates post-operation that results in prolonged hospital

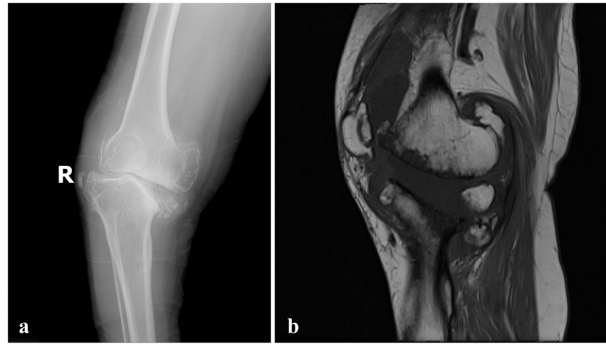


Figure 1. Anteroposterior radiographs and magnetic resonance imaging scans of the patient. Radiograph shows degenerative change and osteophytes in the left knee joint (a) and narrowing the joint space and severe joint destruction (b).



Figure 2. Photographs of the surgical wound at the right knee on postoperative day (POD)-19 (a), POD-25 (b), POD-28 (c), and POD-57 (d).

stays. Rheumatoid arthritis, diabetes mellitus, impertinently joint motion and early weight bearing could be a risk factor for wound dehiscence in TKA [4]. In our study, patient suffered wound dehiscent for trying to walk or for trying to perform passive flexion without any assistant before the superficial wound healing. Furthermore, her body weight was 61 kg and BMI 26.4 kg/cm², which indicated over-weight. Another risk factor in our case study was the wound dehiscent had happened outside the ward that had large possibility of wound infection. Therefore, we had chosen a conservative method through debridement and dressing to avoid closed wound infection. Delayed sutured could be performed when infection excluded preliminary.

Wound healing is a complex, evolutionarily conserved, multi-cellular process [5]. FGF-2 or bFGF have been shown to be integral in cutaneous wound healing, specifically stimulates the growth of normal human epidermal keratinocytes and fibroblast. bFGF could regulate the synthesis and deposition of various extracellular matrix components, also promote keratinocyte motility during the process of re-epithelialization, stimulates the migration of fibroblasts and induce them to produce collagenase in vitro [6]. Currently, recombinant human or bovine basic FGF has been widely used in chronic wound treatment resulted in an improvement in incisional wound healing by an increase in breaking strength, collagen content, and epidermal thickness [7].

4. Conclusion

This is the first case report using bFGF for TKA surgical wound dehiscence. Our therapeutic regimens of rh-bFGF treatment for wound dehiscence started in early stage after determining the opened wound had no infection and instability of the prosthesis. Wound healing was completed at 21 days for the rh-bFGF treated compared to traditional method of debridement. The healing of surgical wound was previously shown to be accelerated by bFGF. In addition, the application of rh-bFGF to superficial wound dehiscence in TKA patients is considered to be reasonable and has the potential to become a promising strategy. Furthermore, it is economically affordable method which will reduce the infection rates and will result in shorter hospital stay.

Conflicts of Interest

The authors declared that they have no conflicts of interest to this work.

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