



Original article

Postoperative infection in patients undergoing inspection of orthopedic damage due to external fixation[☆]



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ABSTRACT

Objective: To conduct a retrospective analysis on cases undergoing inspection of orthopedic damage, at an orthopedic emergency service in a teaching hospital, with the aim of evaluating patients with postoperative infection after conversion to internal osteosynthesis. **Methods:** This was a retrospective analysis covering the period from June 2012 to June 2013, on patients who underwent inspection of orthopedic damage due to external fixation and subsequently were converted to definitive osteosynthesis using a nail or plate.

Results: We found an infection rate of 13.3% in our sample and, furthermore, found that there had been technical errors in setting up the fixator in 60.4% of the cases.

Conclusion: We found an infection rate that we considered high, along with inadequacies in constructing the external fixator. We emphasize that this procedure is not risk-free and that training for physicians who perform this procedure should be mandatory.

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Infecção pós-operatória nos pacientes submetidos ao controle de danos ortopédicos pela fixação externa

RESUMO

Objetivo: Fazer uma análise retrospectiva de casos submetidos ao controle de danos ortopédicos em um pronto socorro de ortopedia de hospital-escola com o objetivo de avaliar os pacientes com infecção pós-operatória após serem convertidos para osteossíntese interna.

Métodos: Análise retrospectiva de pacientes de junho de 2012 a junho de 2013 submetidos ao controle de danos ortopédicos com fixador externo que posteriormente foram convertidos para osteossíntese definitiva, com haste ou placa.

Palavras-chave:

Infecção

Fixadores externos

Fixação interna de fraturas

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Resultados: Encontramos uma taxa de infecção de 13,3% em nossa casuística e verificamos erros técnicos na elaboração do fixador em 60,4% das oportunidades.

Conclusão: Foi encontrada uma taxa de infecção que consideramos alta, assim como de inadequações na confecção do fixador externo. Salientamos que esse procedimento não é isento de riscos e treinamento para médicos que o fazem deve ser obrigatório.

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Introduction

Damage control is the orthopedic surgical tactic established in the literature that is indicated for multiple trauma patients or those with severe soft-tissue injuries.¹ However, this procedure is not free from risks. Local and systemic complications associated with external fixation for damage control have been reported² and one of these is bone infection. Studies have shown infection rates along the paths of the pins ranging from 0.5 to 30%.^{2,3}

Bacterial contamination and infection along the path of the pins of external fixators are relatively common. Conversion to internal osteosynthesis under such conditions, which could involve use of intramedullary nails or plates, may give rise to severe local and/or systemic complications.⁴ The frequency of this association of events is unclear in the literature.³

The correlation between infection along the path of the pins of external fixators and post-traumatic osteomyelitis subsequent to internal osteosynthesis, thus configuring chronic infection of the locomotor system, is well established.^{5,6}

Infection of the bone–pin interface of the fixator has been proven to have a direct association with the insertion technique, with regard to the stability and positioning of the limb during pin placement, given that this might give rise to tension within the soft tissues. Presence of these factors contributes toward infectious complications subsequent to conversion to definitive internal osteosynthesis, irrespective of whether this will involve an intramedullary nail or a plate.^{7,8}

The aim of our study was to identify the quality of reduction and fixation and the frequency of bone infection after definitive treatment, among patients who were admitted to an emergency service over a one-year period and underwent musculoskeletal damage control.

Sample and methods

This study was duly submitted to and approved by our institution's ethics committee and was registered under the committee's protocol number 624.307.

Retrospective evaluations were made on 120 patients who underwent external fixation to control musculoskeletal damage between June 2012 and June 2013, attended as emergencies at the emergency service of our institution's Department of Orthopedics and Traumatology.

In this retrospective study, we included patients who underwent damage control surgery consisting of external

fixation and who, after conversion to definitive osteosynthesis, evolved with infection.

Patients who presented infectious complications in the presence of local and systemic alterations such as vasculopathy, diabetes mellitus or consumptive disease, and patients with psychiatric disorders that might have impaired the evolution of the condition or care provided for the fixator in some manner, were excluded.

All the radiographs were generated in digital form and were analyzed through the Impax software. The distances from the orifice and Schanz pins to the definitive synthesis were analyzed within this software. We sought to identify any presence of technical errors during the drilling (characterized by multiple drilling), with subjective analysis conducted by three different groups of two evaluators. One group was formed by attending physicians with at least five years of experience in orthopedic trauma; another group was formed by two third-year residents and a third group was formed by two residents in the second year of orthopedics. The evaluators were named as follows (Table 1):

- Evaluator 1: attending physician with more than five years of experience
- Evaluator 2: attending physician with more than five years of experience
- Evaluator 3: third-year resident
- Evaluator 4: third-year resident
- Evaluator 5: second-year resident
- Evaluator 6: second-year resident

Postoperative infection was characterized by means of a clinical examination conducted during hospitalization or at an outpatient investigation, from the data noted in the medical files. The clinical criteria for infection were taken to be the following: erythema, hyperemia or fistula along the paths of the pins or in the surgical incision (Fig. 1).

During the external fixation, the holes drilled previously using a bit were always respected and the pins were inserted manually. None of the pins were in the zone of exposure of the fracture.

In evaluating the radiographs, we observed the pre and postoperative examinations and measured the positions of the Schanz pins and their distances from the definitive synthesis. We took the presence of drilled holes in numbers greater than the number of pins installed to suggest that there had been some difficulty and additional damage in installing the external fixator. We also noted any presence of osteolysis in the orifices through which the Schanz pins were installed, and whether the drill hole locations for the pins brought any

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