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ORIGINAL ARTICLE

The benefits of digital chest drainage in pleural decortication in thoracic empyema. Prospective, randomised, control trial☆

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KEYWORDS
Digital chest drainage;
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Abstract
Background: Prolonged air leak after pleural decortication is one of the most frequent complications.
Objective: The aim of this study is to compare the effects of prolonged air leak between the digital chest drainage (DCD) system and the classic drainage system in patients with empyema class IIB or III (American Thoracic Society classification) in pleural decortication patients.
Material and methods: A total of 37 patients were enrolled in a prospective randomised control trial over one year, consisting of 2 blinded groups, comparing prolonged air leak as a main outcome, the number of days until removal of chest drain, length of hospital stay and complications as secondary outcomes.
Results: The percentage of prolonged air leak was 11% in the DCD group and 5% in the classic group ($p = 0.581$); the mean number of days of air leak was 2.5±1.8 and 2.4±2.2, respectively ($p = 0.966$). The mean number of days until chest tube removal was 4.5±1.8 and 5.1±2.5 ($p = 0.41$), the length of hospital stay was 7.8±3.7 and 8.9±4.0 ($p = 0.441$) and the complication percentages were 4 (22%) and 7 (36%), respectively ($p = 0.227$).
Discussion: In this study, no significant difference was observed when the DCD was compared with the classic system. This was the first randomised clinical trial for this indication; thus, future complementing studies are warranted.
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PALABRAS CLAVE
Drenaje torácico digital;
Fuga aérea prolongada;
Decorticación

Beneficios del drenaje torácico digital en pleurodecorticación por empiema. Estudio prospectivo, comparativo aleatorizado

Resumen
Antecedentes: La fuga aérea prolongada después de una pleuro-decorticación en una de las complicaciones más frecuentes.
Objetivo: El objetivo de este estudio es comparar la fuga aérea entre el sistema de drenaje torácico digital (DCD) y el sistema de drenaje clásico, en pacientes con empiema de clase IIB o III (clasificación de la Sociedad Americana de Tórax) intervenidos mediante pleuro-decorticación.
Material y métodos: De manera prospectiva, comparativa y aleatorizada, 37 pacientes fueron estudiados en un periodo de un año. Divididos en 2 grupos, se comparó la fuga aérea postoperatoria, analizándose el número de días de internamiento, el día de retiro de los drenajes, así como las complicaciones en ambos grupos.
Resultados: El porcentaje de fuga aérea prolongada fue del 11% en el grupo DCD y del 5% en el grupo de drenaje clásico ($p = 0{,}581$); el número de días con fuga aérea fue de $2{,}5 \pm 1{,}8$ y $2{,}4 \pm 2{,}2$, respectivamente ($p = 0{,}966$). El número de días para retiro de drenaje fue $4{,}5 \pm 1{,}8$ y $5{,}1 \pm 2{,}5$ ($p = 0{,}41$), la estancia intrahospitalaria fue de $7{,}8 \pm 3{,}7$ y $8{,}9 \pm 4$ días ($p = 0{,}441$) y el porcentaje de complicaciones fue 22 y 36%, respectivamente ($p = 0{,}227$).
Discusión: En este estudio se observa una tendencia positiva pero no significativa a favor del uso de los DCD cuando se comparan con el drenaje clásico. Estudios más largos y multicéntricos son requeridos.
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Background

Empyema is one of the most common surgical chest conditions in Mexico. A great many of these patients (45%) require surgical treatment, which represents around 90 cases of pleural decortication.[1]

Air leak after complete decortication is to be expected, and even more so in advanced empyema.[2] However, digital chest drainage (DCD) digital has shown good results in the management of prolonged air leak in various surgical procedures.[3] A reduction in days of drainage and hospital stay has been demonstrated with these drains.[3–7] Probably one of their greatest advantages is the elimination of inter-observer variability on assessing air leak for removal of the drains.[7,8] The DCD system has even been used in ambulant patients with prolonged air leak.[7,9]

DCD use in pleural decortication has not been described in the literature. Therefore, the aim of our study was to evaluate its potential benefits, which will be valuable information for surgeons, since this technology is increasingly available in chest surgery departments.

Material and methods

A prospective, comparative and randomised study of 37 patients treated with pleural decortication due to empyema classified as IIB or III by the American Thoracic Society, in the period from March 2013 to February 2014. The sample size was calculated according to the published data.[7] The statistical power was set at 5% and the beta error at 80%, with a minimum of 16 patients per group. The DCD group had 18 patients, and there were 17 in the traditional group.

The patients included in the study had IIB or III empyema, which had not been resolved by the placement of a drain. Patients with other grades of empyema, those who underwent thoracoscopic surgery, and those with a physical status classification greater than ASA III prior to anaesthesia were excluded.

The Thopaz-Medela™ (Switzerland) system was used for the DCD group; traditional Atrium Ocean™ drains were used (U.S.A.) for the control group.

All the patients signed their informed consent which included them in this study protocol, in compliance with the guidelines of the institution's ethics committee.

The surgical technique was standard for all the patients: a posterolateral thoracotomy was performed and then pleural decortication, as described by Delorme and Deslauries.[10] Two rigid 32 F Argyle™ drains were placed, one anterior and the other posterior, attached to a Y connector, configured at a postoperative suction of -15 cm H_2O, immediately after closure of the thoracic wall. The criteria for removal of the drains were: air leak less than 40 ml/min in the past 12 h for the DCD patients, and lack of air leak for the traditional drains according to the Modified Robert David Cerfolio (MRDC) classification, both with complete lung reexpansion confirmed by chest X-ray. With regard to the amount of fluid collected, the drain was removed when the loss was less than 2 ml/kg in 24 h (Table 1).

Air leak persisting longer than 7 days was considered prolonged.[4] The days until removal of the drain, the days of hospital stay, and the number and type of complications appearing in each group were quantified.

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