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ORIGINAL ARTICLE

Risk factors for nosocomial pneumonia in patients with abdominal surgery[☆]



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KEYWORDS

Pneumonia;
Surgery;
Risk factors

Abstract

Background: The risk of post-operative pneumonia is a latent complication. A study was conducted to determine its risk factors in abdominal surgery.

Material and methods: A cross-sectional study was performed that included analysing the variables of age and gender, chronic obstructive pulmonary disease and smoking, serum albumin, type of surgery and anaesthesia, emergency or elective surgery, incision site, duration of surgery, length of hospital stay, length of stay in the intensive care unit, and time on mechanical ventilation. The adjusted *odds ratio* for risk factors was obtained using multivariate logistic regression.

Results: The study included 91 (9.6%) patients with pneumonia and 851 (90.4%) without pneumonia. Age 60 years or over (OR = 2.34), smoking (OR = 9.48), chronic obstructive pulmonary disease (OR = 3.52), emergency surgery (OR = 2.48), general anaesthesia (OR = 3.18), surgical time 120 min or over (OR = 5.79), time in intensive care unit 7 days or over (OR = 1.23), time on mechanical ventilation greater than or equal to 4 days (OR = 5.93) and length of post-operative hospital stay of 15 days or over (OR = 1.20), were observed as independent predictors for the development of postoperative pneumonia.

Conclusions: Identifying risk factors for post-operative pneumonia may prevent their occurrence. The length in the intensive care unit of greater than or equal to 7 days (OR = 1.23; 95% CI 1.07–1.42) and a length postoperative hospital stay of 15 days or more (OR = 1.20; 95% CI 1.07–1.34) were the predictive factors most strongly associated with lung infection in this study.

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PALABRAS CLAVE

Neumonía;
Cirugía;
Factores de riesgo

Factores de riesgo para neumonía nosocomial en pacientes con cirugía abdominal**Resumen**

Antecedentes: El riesgo de neumonía postoperatoria es una complicación latente. Realizamos una investigación para definir sus factores de riesgo en cirugía abdominal.

Material y métodos: Mediante un estudio transversal analizamos la edad y género, enfermedad pulmonar obstructiva crónica y tabaquismo, albúmina sérica, tipo de cirugía y de anestesia, operación de urgencia o electiva, sitio de la incisión, duración de la operación; tiempo de hospitalización, en la Unidad de Cuidados Intensivos y, en Ventilación Mecánica Asistida. Por regresión logística multivariado obtuvimos la *odds ratio* ajustada para los factores de riesgo.

Resultados: Estudiamos a 91 (9.6%) pacientes con neumonía y, 851 (90.4%) sin neumonía. Identificamos la edad ≥ 60 años (OR=2.34), el tabaquismo (OR=9.48), la enfermedad pulmonar obstructiva crónica (OR=3.52), la intervención quirúrgica de urgencia (OR=2.48), la anestesia general (OR=3.18), el tiempo quirúrgico ≥ 120 min (OR=5.79), el tiempo en la Unidad de Cuidados Intensivos ≥ 7 días (OR=1.23), el tiempo en ventilación mecánica asistida ≥ 4 días (OR=5.93) y el tiempo de hospitalización postoperatoria ≥ 15 días (OR=1.20) como factores predictivos independientes para el desarrollo de neumonía postoperatoria.

Conclusiones: La identificación de factores de riesgo para la neumonía postoperatoria puede prevenir su aparición. El tiempo en la Unidad de Cuidados Intensivos ≥ 7 días (OR=1.23; IC del 95%, 1.07–1.42) y de hospitalización postoperatoria ≥ 15 días (OR=1.20; IC del 95%, 1.07–1.34) fueron los factores predictivos más fuertemente asociados con la infección pulmonar en nuestro estudio.

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Background

Despite the advances in surgical and anaesthetic techniques, the risk of developing postoperative pneumonia remains a latent complication, probably owing to an ageing population, with higher morbidity, and who undergo more complex surgery. In this regard, one study reported that 36% of the episodes of nosocomial pneumonia in their series of patients were diagnosed in the operating theatre.¹ This disease is defined as an infection of the pulmonary parenchyma which is neither present nor in the incubation period, at the time the patient is admitted to hospital, and develops 48h after admission.² After urinary tract infections, pneumonia is the second most common of all nosocomial infections, with a frequency of 13–18%.^{2,3} However, it is responsible for 20–70% of deaths associated with hospital-acquired infection, especially in patients admitted to intensive care units who receive assisted mechanical ventilation.^{2,4} In this context, between 9% and 40% of patients who undergo abdominal surgery present, at least one pulmonary complication,^{5,6} with an overall mortality, specifically for pneumonia, of between 19% and 45%, and up to 65% when there is a history of intra-abdominal infection.⁷

Because postoperative pneumonia incurs high morbimortality, high costs and prolonged hospital stay,² we undertook an investigation study to define the impact of possible risk factors for pneumonia in patients undergoing abdominal surgery. The information obtained will enable health programmes to be set up for the prevention, and control of this infection in surgical departments.

Material and methods

Between 3 January 2011 and 30 December 2013, we performed an analytical cross-sectional study to determine risk factors associated with postoperative nosocomial pneumonia. All elective and emergency postoperative patients with intra-abdominal oncological and general surgical conditions; men and women > 18 years of age, and with a hospital stay > 48h post surgery. Patients who underwent laparoscopic surgery, and those in whom trauma was the reason for their abdominal surgery, patients with a preoperative diagnosis of pneumonia or any other identifiable infection, patients who were under or had had assisted mechanical ventilation prior to their surgical intervention, those who had undergone abdominal reoperation during the same hospital stay, and patients with a postoperative abdominal infection were excluded from the study. For the analysis of the risk factors associated with the disease, we identified all the consecutive patients with postoperative pneumonia in the study period as response cases, whereas patients without pneumonia were the control group cases. The potential risk factors were selected based on the clinical experience of the authors and previous studies.^{5,7}

The *Dr. Valentín Gómez Farías* hospital is a regional reference centre with third level healthcare and teaching services in the Guadalajara Metropolitan Area, Mexico. It has 204 hospital beds and 15 intensive care beds with mechanical ventilation equipment, and invasive haemodynamic monitoring equipment for adult surgical, medical, and trauma conditions. There were 34,717 hospitalised patients

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