

Clinical Utility of an Undersized Nurse-Operated Recovery Room in the Postoperative Course: Results From an Italian Community Setting

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Purpose: In Europe, standardized criteria for recovery room (RR) requirements have not been established. The purpose of this study was to examine the clinical utility of an undersized nurse-operated RR in an Italian community hospital.

Design: Single-center observational study.

Methods: A total of 1,945 consecutive surgical patients admitted to the RR at the study institution between September 31, 2009, and August 31, 2011, were included in the study. A control group of surgical patients not admitted to the RR, matched for age, gender, American Society of Anesthesiologists score, and type of surgery were also considered. The prevalence of early adverse events occurring within 3 hours of the end of surgery was compared between the two groups.

Findings: Patients admitted to the RR (mean age, 73.6 ± 14.2 years; 42.2% male; and 76.3% having major surgery) showed lower prevalences of hypotension ($P < .0001$), hypertensive response ($P < .0001$), new arrhythmias requiring intervention ($P = .0036$), and oxygen desaturation ($P < .0001$) in comparison with the control group. No differences in the proportions of patients experiencing postoperative nausea and vomiting, shivering, bleeding, and respiratory events were found. The Numeric Rating Scale for pain was also significantly lower at 2 hours in the study group as compared to the control group (1 [0 to 5] vs 3 [1 to 7]; $P < .0001$).

Conclusion: In this Italian community setting, an undersized nurse-operated RR contributed to a reduced prevalence of adverse postoperative events.

Keywords: recovery room, post-anesthetic care unit, postoperative adverse events, research.

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THE RECOVERY ROOM (RR) is a hospital area where patients are taken from the operating theatre and remain until consciousness is recovered and cardiorespiratory function is stabilized.¹ The rationale for the use of a RR is based on the evidence that most adverse postoperative events take place within the first hours after surgery.^{2,3} Currently, a RR or postanesthesia care unit stay is mandatory in the United States⁴; however, no standardized criteria for the postoperative management of patients exist in European countries on which to base shared guidelines. In particular, there is no consensus regarding the dimensions and the structural characteristics of postanesthesia recovery areas. Uncertainties exist regarding the appropriate number of beds in relation to the total operating rooms, operating hours, and the need for a dedicated health staff.⁵⁻⁷ Accordingly, in most European facilities, a RR does not exist, and the postoperative recovery takes place in ordinary stay surgical wards or in an intensive care unit (ICU). As this lack of RR areas is also partially related to a paucity of resources, an exploration of the potential impact of an undersized RR may be of practical interest in the postoperative management of surgical patients. Therefore, the purpose of this study was to explore the clinical utility of an undersized, nurse-operated daytime RR in an Italian large-volume community hospital.

Materials and Methods

Study Population

Group 1 (study group) included 1,945 consecutive patients (age range, 16 to 105 years) who underwent general, orthopedic (prosthetic and trauma), gynecological, urological, plastic, and endoscopic surgeries and who were admitted to the RR of the Santa Maria Annunziata Hospital, Florence, Italy, between September 1, 2009, and August 31, 2011. These subjects represented 23.3% of the total population ($n = 8,350$) of patients admitted for surgery at our hospital during the period of study. Group 2 (control group) included patients admitted for surgery during the period of study but not admitted to the RR, matched for age, gender, American Society Anesthesiologists (ASA) score, and type of surgery (major or minor) to the patients of Group 1. For the selection of this control group, we first observed that the majority of patients admitted to the RR ($n = 1,485$; 76.3%)

had undergone major surgery. Because the same proportion of major surgery had to be present in the control group, and considering that the number of patients admitted for major surgery during the period of study and not admitted to the RR was relatively small ($n = 101$), we decided to enroll the matching control group using a 25:1 scheme, that is, by selecting a total of $1,945/25 = 78$ controls. The matching procedure was performed as follows. First, we divided Group 1 into 78 subsets, each including 25 randomly selected patients with equal gender and equal type of surgery (the last subset included 20 patients). Then, for each of these subsets, we selected one control patient with concordant gender and type of surgery, using a ± 5 years criterion with respect to the average age of the subset and a ± 0.5 criterion with respect to the average ASA score of the subset.

Setting

Our facility has a total of five active operating theatres. Four of these are available for surgery of choice, whereas one is used for emergencies. According to our in-hospital protocols, the postoperative course can be characterized by return to the ward, admission to the RR, or transfer to the ICU. Unlike US hospitals, where every surgical patient comes to a recovery area, admission to the RR in the study institution is decided by the anesthesiologist on the basis of a multiparametric assessment that takes into account type of surgery (grading 1 to 4), associated comorbidities according to ASA classification, emergency surgery, and/or significant intraoperative complications.⁸

Our RR was activated in April 2009 as a consequence of the expansion of the surgical section with the creation of three new operating rooms. The RR in our institution is located at the centre of the operating unit and has four beds with multiparametric monitoring, capability for invasive and noninvasive ventilation, and informatic connections to the analysis laboratory and the ward (Figure 1). The RR is open Monday to Friday, from 08:00 a.m. to 07:00 p.m., with the constant presence of an ICU nurse and a maximum assistance ratio of 1:4, the upper limit established by Italian recommendations.¹ The nurse receives the patient in the RR from the operating

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