managementu způsobena supraventrikulární tachyarytmií (SVT) na EKG nebo pneumonií na CXR. Pacienti s PCCS kvůli SVT měli rychlý srdeční rytmus (HR) (průměrně 141 tepů za minutu oproti 79 u ostatních). Hodnota HR pod 125 tepů/min měla 100% negativní prediktivní hodnotu (NPV) pro PCCS. Pacienti s PCCS kvůli pneumonii měli vyšší hodnoty C-reaktivního proteinu (CRP) (medián 189 mg/l oproti 7 mg/l u ostatních). Hodnota CRP pod 62 mg/l měla 100% NPV pro PCCS. Riziko 90denní pooperační úmrtnosti bylo zvýšené u pacientů s HR nad 100 tepů/min (RR=2,08), přičemž riziko dále rostlo s vyšším HR, a u pacientů s abnormálním CXR ve srovnání s normálním CXR (RR=2,49).

Závěry: EKG i CXR měly velmi omezenou hodnotu v předoperačním managementu hospitalizovaných pacientů podstupujících neplánované NCS. Doporučujeme použít HR (> 100 tepů/min) a CRP (> 61 mg/l) jako indikátory pro testování EKG a CXR, spíše než věk, jako doplněk k anamnéze a klinickým nálezům. HR nad 124 tepů/min by měl odlišit pacienty s vyšší pravděpodobností změn v předoperačním managementu. Také doporučujeme využít abnormální CXR (pokud je dostupný) a HR přesahující 100 tepů/min k identifikaci pacientů s vyšším relativním rizikem pooperační úmrtnosti.

Klíčová slova: arytmie, c-reaktivní protein, elektrokardiografie, pneumonie, retrospektivní studie, rentgenové snímky.

Introduction

An electrocardiogram (ECG) and a chest X-ray (CXR) are widely used in the preoperative period for patients undergoing non-cardiac surgery (NCS), even before a low-risk surgery. However, guideline recommendations are to limit these tests in low-risk cases (1-2).

A previous multivariate analysis showed that patients over 64 years old with a history of hypertension were at greater risk of major ECG changes (3), and that finding was supported by other studies (4). However, an analysis of over 150 000 patients revealed that a preoperative ECG (despite being abnormal) provided only limited clinical information, beyond the patient's demographic and clinical history, for predicting in-hospital deaths and perioperative myocardial infarctions (5). In low-risk patients that underwent low-risk surgery, a preoperative ECG did not predict early treatment termination and triggered very few surgery cancelations; thus, it had very little effect on preoperative management (6). In a study of 991 patients over 40 years of age that underwent an elective NCS, an abnormal ECG rarely interfered with preoperative management (7). On the other hand, a prospective study from 2002 suggested that an ECG should be conducted in patients over 40 years of age or those with cardiac or respiratory symptoms prior to an elective NCS, even though an abnormal ECG led to preoperative changes in only 0.5% of the patients (8). Older studies on patients prior to an elective NCS reported a low to high prevalence of ECG abnormalities, but they had little influence on preoperative management (9-10). No randomized controlled trial has shown that a preoperative ECG could reduce postoperative complications or mortality. Furthermore, one study showed that a disturbing percentage of ECGs were not even reviewed prior to an NCS (11).

A preoperative CXR is unnecessary in many patients undergoing an elective surgery (12), but it greatly increases the costs (13-14). In a small study (in an elective setting), a high percentage of older patients (over 70 years) had abnormal findings on a preoperative CXR (15); however, changes in preoperative management due to these findings were not studied. Moreover, surgical or anesthetic procedures are rarely modified due to an abnormal CXR in general surgery for patients without cancer (16-17). Consequently, age, and a few other cut-off values, have been proposed to limit the routine use of preoperative CXR (18-20). A study from 1988 showed that there were no complications directly associated with the lack of preoperative CXR (21). Another study showed that perioperative complications did not increase as a result of no preoperative testing (in a given population of ambulatory patients undergoing surgery) (22). In a multi-center study, the usefulness of preoperative CXR increased with age and The American Society of Anesthesiologists (ASA) physical status classification system (23).

While in foreign countries the performance of ECG and CXR leads to an increase in the cost of surgery, in the Czech Republic, the cost of ECG or CXR does not significantly increase the overall surgical costs, but on the other hand might lead to an increased staff workload, thus wasting valuable personal resources.

However, those studies were performed either on somewhat selected groups of patients or prior to an elective NCS. The present study investigated the value of preoperative ECG and CXR and their impact on changes in preoperative management in an unselected population undergoing non-elective NCS.

Methods

Study design and patients

This study was designed as a retrospective, single-center analysis, based on hospital records of patients that underwent internal preoperative examinations before a non-elective NCS. There were no exclusion criteria. A computerized search identified all consecutive patients that underwent an internal examination required by any specialty, between November 2015 and September 2021. The total number of reviewed internal examinations was 4074. Of these, 2362 were preoperative internal examinations. All 2362 preoperative internal examinations were included in the analysis to provide unselected patient data.

All enrolled patients were hospitalized and scheduled for non-elective NCS. The surgeries included postponable, semi-acute, acute, and urgent. The fields of surgery included abdominal surgery, traumatology, urology, neurosurgery, gynecology, vascular surgery, proctosurgery, and otorhinolaryngology.

For each enrolled patient, we recorded 53 parameters. These parameters included age, sex, disease history, surgical field, height, weight, body-mass index (BMI), smoking, basic laboratory parameters, blood