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Cardiac arrest under neuraxial anesthesia at the Mayo Clinic from 1982-2002: Predisposing factors and survival

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Introduction: The etiology and frequency of cardiac arrest under neuraxial anesthesia remains undefined. In a prospective study involving 103,730 regional anesthetics, Auroy et al (1) reported 32 cardiac arrests associated with neuraxial anesthesia. Six of the 32 cardiac arrests (all associated with spinal anesthesia) were fatal. The risk of death after cardiac arrest was associated with age and ASA physical status class. Also, the cardiac arrest was typically associated with a specific surgical event, such as cementing during hip arthroplasty. These results contradict those of the ASA Closed Claim Database, which include 14 cases of sudden cardiac arrest in young patients receiving spinal anesthesia between 1978 and 1986 (2). Of the eight survivors, only one exhibited sufficient neurologic recovery to allow independence in self-care. A more recent review of the Closed Claims Project noted 181 cases now exist; and in 161 cases the patient suffered severe brain damage or death.

This retrospective study investigated the patient, surgical, and anesthetic variables, as well as the short- and long-term survival associated with cardiac arrest during neuraxial blockade.

Methods: Using the Mayo Clinic quality assurance database from 1982-2002, all cases of intraoperative cardiac arrest under neuraxial anesthesia were reviewed. Patient variables (age, gender, preexisting medical conditions, medications and surgical procedures) were noted. Details of the anesthetic (type of neuraxial block, time and total dose of local anesthetic, level of sympathectomy, and administration of sedatives/analgesics) were also recorded. Medications and techniques, such as CPR and defibrillation during resuscitation, and the short and long-term outcomes of each cardiac arrest were also recorded.

Results: During the 20-year study period, intraoperative cardiac arrest under neuraxial anesthesia occurred in 22 patients. Mean patient age was 64 years (range 34-83). Only four patients were under 50 years of age. All patients were undergoing elective operative procedures. Nine patients were undergoing orthopedic procedures, consisting of three total hip arthroplasties, three femur fractures, one knee arthroscopy, one total knee arthroplasty, and one minor foot procedure. Seven patients were undergoing transurethral resection of the prostate. Five patients were undergoing general surgeries, consisting of two hemorrhoidectomies, one inguinal hernia repair, one bilateral groin exploration, and one anal fistulotomy. One patient experienced a cardiac arrest during a vaginal birth.

Most cardiac arrests occurred under spinal block. In 17 cases the patients had undergone a spinal anesthetic, including one continuous spinal technique. Three patients had received a continuous epidural, and two patients had a caudal anesthetic. The highest level of block documented before cardiac arrest averaged T_6. One patient experienced cardiac arrest during placement of the neuraxial block. Eighteen patients arrested during the anesthetic course, eight of which occurred during a specific surgical event; such as cementing of joint components, spermatic cord manipulation, intramedullary rod placement, irrigation of the bladder, or reaming of a femur. One patient arrested during emergence, and two arrested in the recovery room.

Sixteen patients survived the cardiac arrest and were subsequently discharged from the hospital; in the remaining six patients, the cardiac arrest was fatal. The length of resuscitation was significantly shorter (typically less than five minutes) in those patients surviving the initial cardiac arrest.

Discussion: Our review suggests that cardiac arrest under neuraxial anesthesia is a relatively rare occurrence and is likely to be associated with an intraoperative surgical event in elderly patients. Furthermore, resuscitation is likely to be successful (73% of our patients survived the cardiac arrest and were discharged from the hospital). These results are similar to those of Auroy et al (1). In fact, none of the patients in our series resemble the cases included in the ASA Closed Claims Project (young, healthy patients who are unresuscitatable despite immediate and appropriate intervention). Rather, cases included in the closed claims project represent a small subset of cardiac arrests during neuraxial block (2).

References*:*

1. Auroy Y. Anesthesiology 1997; 87:479-486.
2. Caplan RA. Anesthesiology 1988; 68:5-11