Prevention of generalized reactions to contrast media: a consensus report and guidelines

Abstract The aim of this study was to document, using consensus methodology, current practice for prevention of generalized reactions to contrast media, to identify areas where there is disagreement or confusion and to draw up guidelines for reducing the risk of generalized contrast media reactions based on the survey and a review of the literature. A document with 165 questions was mailed to 202 members of the European Society of Urogenital Radiology. The questions covered risk factors and prophylactic measures for generalized contrast media reactions. Sixty-eight members (34%) responded. The majority indicated that a history of moderate and severe reaction(s) to contrast media and asthma are important risk factors. The survey also indicated that patients with risk factors should receive non-ionic contrast media. In patients at high risk of reaction, if the examination is deemed absolutely necessary, a resuscitation team should be available at the time of the procedure. The majority (91%) used corticosteroid prophylaxis given at least 11 h before contrast medium to patients at increased risk of reaction. The frequency of the dosage varied from one to three times. Fifty-five percent also use antihistamine H1, mainly administered orally and once. Anti-histamine H2 and ephedrine are rarely used. All essential drugs are available on the emergency resuscitation trolley. Patients with risk factors are observed up to 30 min by 48% and up to 60 min by 43% of the responders. Prophylactic measures are not taken before extravascular use of contrast media. Prophylactic drugs are given to patients with a history of moderate or severe generalized reaction to contrast media. In patients with asthma, opinion is divided with only half of the responders giving prophylactic drugs. Aspirin, β-blockers, interleukin-2 and non-steroid anti-inflammatory drugs are not considered risk factors and therefore are not stopped before injection of contrast media. The survey showed some variability in rating of risk factors for generalized contrast medium reactions, and marked variability in the prophylactic measures used. There remain major areas of uncertainty, and there is insufficient data in the literature to guide practice. Some simple guidelines for prophylaxis of generalized contrast medium reactions are proposed.

Keywords Contrast media · Consensus · Generalized reaction · Risk factors · Prophylaxis · Guidelines
Introduction

The European Society of Urogenital Radiology (ESUR) is committed to promoting research into contrast media and improving knowledge about them. The Contrast Media Safety Committee (CMSC) of ESUR has recently produced guidelines for prevention of contrast medium nephrotoxicity [1] and for the use of intravascular contrast media in diabetic patients receiving metformin [2]. In this report attention is focused on how to prevent generalized adverse reactions to intravascular contrast media. There seems to be little agreement about the best method to prevent reactions, and it was considered that there was concern that there might be discrepancies between current practice and published recommendations for prevention of reactions. Guidelines can be produced either by opinion-based methods in which a group of experts reach consensus on a protocol or by evidence-based methods which rely on an analysis of the scientific evidence [3, 4]. Opinion-based methods, which are quicker and require few resources, have been widely used [3, 4]; however, with this approach recommendations may not be based on experimental evidence and the process for achieving consensus is often not well documented. As a result, it is difficult for others to evaluate the process and this can lead to speculation about partiality and conflict of interest [3, 4]. Although evidence-based methods are the ideal, because of the lack of scientific evidence on some aspects of prevention of generalized reactions to contrast media and the time, which would be necessary to produce evidence-based guidelines, it was considered helpful to produce temporary guidelines based on wide consensus with careful documentation of how consensus was reached.

The committee surveyed current practice for prevention of contrast media reactions among members of ESUR to produce a consensus report and to provide guidelines on prevention. In addition, the report and guidelines were discussed with the participants at the Seventh European Symposium on Urogenital Radiology to establish consensus on the different issues.

Methods

A questionnaire compiled by the CMSC was circulated to 202 members of the ESUR. The Delphi process was used as a guide to developing consensus [3, 4]. The questionnaire consisted of 165 statements mainly covering risk factors and prophylactic measures for generalized contrast media reactions. Flushing, nausea, vomiting and headache were considered to be mild reactions. Urticaria, bronchospasm and moderate hypotension were considered to be moderate reactions. Convulsions, severe bronchospasm, pulmonary edema and cardiovascular collapse were considered to be severe reactions. The Delphi process was used to grade the importance of different risk factors. Members were asked to grade a potential risk factor from 1 to 10 to indicate its importance. A score of 1 indicated that the statement was definitely not important, a score of 5 indicated that its importance was uncertain and a score of 10 indicated that the statement was extremely important. Fractions in ratings were not allowed. Regarding the prophylactic measures, the members were asked to answer “yes” or “no” as well as to provide factual information.

The graded answers were analysed to establish the mean and the standard deviation rating for each statement. A mean score of 6 or more for any statement was considered as positive consensus for importance. The “yes” or “no” answers were calculated as a percentage of the total number of received questionnaires. Sixty percent of responders or more was considered as positive consensus.

Based on an analysis of the response to the questionnaire, and a review of the literature, the CMSC drew up guidelines for preventing generalized contrast medium reactions. The report was discussed at the Seventh European Symposium on Urogenital Radiology (London, September 2000) and comments from the 250 participants are incorporated herein.

Results

Answers were received from 68 members (34%). Ninety-one percent of them work in a teaching hospital.

Risk factors

Members considered a history of asthma and a history of moderate or severe reactions to contrast media to be the most important risk factors for generalized contrast medium reactions (Table 1). Anxiety, hay fever and other allergic disorders were not considered important risk factors, nor were concurrent administration of drugs such as β-blockers, interleukin 2, aspirin and non-steroid anti-inflammatory drugs.

Contrast media

The majority do not administer ionic contrast media to patients to be considered at high risk of having a systemic contrast medium reaction (Table 2) and prefer to give non-ionic contrast media. Most responders indicated that they refuse to administer iodinated contrast media in patients at very high risk for generalized contrast medium reactions. If contrast media are considered absolutely necessary, they insist on the presence of a resuscitation team during the procedure (Table 2).

Prophylactic measures

The majority of responders do not stop the administration of aspirin, β-blockers, non-steroid anti-inflammatory drugs or interleukin-2 before contrast medium ad-