

# Management of Allergic Reactions to Contrast Media in Computed Tomography (CT) and Magnetic Resonance Imaging (MRI)

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## KEYWORDS:

Contrast media; CT; MRI; Emergency Management; Patient Safety

## ABSTRACT

*This study examines the best practices for managing allergic reactions to contrast media used in CT and MRI. The iodine- and gadolinium-based contrast agents commonly used to enhance the quality of diagnostic images can cause adverse reactions of varying severity. This article provides an overview of preventive strategies, intra-procedural and post-procedural management, as well as recommendations for future planning and patient education. Additionally, the role of prophylaxis and the importance of involving anesthesiologists in emergency situations are discussed.*

## INTRODUCTION

The use of contrast agents in CT and MRI is essential to improve the quality of diagnostic images, allowing for more detailed visualization of internal structures. However, the administration of these agents can be associated with allergic reactions ranging from mild to potentially life-threatening. Timely and appropriate management of these reactions is crucial to ensure patient safety (European Society of Urogenital Radiology, 2018 [1]; American College of Radiology, 2017)[2]. This article examines current practices and guidelines for managing allergic reactions to contrast media.

## METHODOLOGY

After several episodes of allergic reactions occurring in our hospital, we began to question the management and prevention strategies adopted. To this end, we reviewed the latest Italian regulations and guidelines from the Italian Society of Medical Radiology (SIRM) and the Italian Medicines Agency (AIFA), as well as relevant European guidelines (SIRM 2018 [3]; ESUR 2018 [4]). We analyzed our experience regarding prophylaxis, which in our context has shown good results or at least limited the severity of allergic reactions. Additionally, we reported every reaction episode through the pharmacovigilance portal and maintained an open discussion table between the radiology department and the on-call anesthetists to continuously improve our practices.

### Prevention

Preventing allergic reactions begins with a detailed patient history, which is essential to identify at-risk individuals (Murphy et al., 1999)[5]. Premedication

with corticosteroids and antihistamines is recommended for patients with a documented history of allergic reactions, although its efficacy varies depending on the type of contrast agent used (Katayama et al., 1990)[6]. Additionally, in patients at risk of renal failure, pre- and post-procedural hydration is crucial to reduce the risk of contrast-induced nephropathy (Brown et al., 2009[7]; Davenport et al., 2013[8]). SIRM and AIFA guidelines emphasize the importance of personalized risk assessment for each patient (SIRM 2018[9]).

### Intra-Procedural Management

Continuous patient monitoring during the procedure is essential to promptly identify any adverse reactions (ESUR 2018)[10]. It is important to maintain venous access for the rapid administration of life-saving drugs in case of an emergency (ACR 2017)[11]. SIRM recommends that each radiology department have a well-defined emergency protocol and an emergency kit with essential drugs (SIRM 2018)[12].

### Management of Adverse Reactions

Adverse reactions can range from mild to severe. Mild reactions, such as itching or skin rash, require the discontinuation of contrast administration and patient monitoring (Murphy et al., 1999)[13]. Moderate reactions require more aggressive interventions, such as oxygen administration and bronchodilators, while severe reactions, such as anaphylactic shock, necessitate immediate intervention with adrenaline and advanced life support (Katayama et al., 1990[14]; Thomsen & Morcos, 2005[15]).



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### Post-Procedure and Future Planning

After an adverse reaction, the patient should be monitored to prevent recurrence (SIRM 2018)[16]. It is essential to thoroughly document the event to improve future management and inform the patient about the risks associated with future exposures to contrast agents (WHO 2016)[17]. In cases of moderate or severe reactions, an allergist's evaluation is recommended to plan for future exposures. SIRM recommends the use of non-iodinated contrast agents or alternative diagnostic methods for high-risk patients (SIRM 2018)[18].

### DISCUSSION

The debate on the efficacy of prophylaxis in at-risk patients is still ongoing (ACR 2017). While some international guidelines question its usefulness (ESUR 2018), it remains a common practice in many contexts. In our case, prophylaxis proved effective in

limiting the severity of reactions. Furthermore, the timely involvement of the anesthesiologist during contrast procedures is crucial for managing severe reactions such as anaphylaxis (SIRM 2018). Collaboration between different departments of our hospital has allowed continuous improvement of the practices adopted.

### CONCLUSIONS

Managing allergic reactions to contrast media requires a multidisciplinary approach and continuous training of healthcare personnel. The implementation of standardized protocols and patient education is essential to improve the safety and effectiveness of diagnostic procedures. Our experience confirms the importance of close collaboration between radiologists and anesthesiologists and the value of prophylaxis in preventing allergic reactions.

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