

High Safety of Regadenoson for Myocardial Perfusion Imaging in a Cardiology Practice: Experience in over 4000 Patients

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Introduction: Regadenoson, a highly effective selective A_{2A} receptor agonist, is an approved alternative to Adenosine for myocardial perfusion stress imaging. The use of Regadenoson is easier than of Adenosine. There is, however, little data regarding its safety in daily cardiology practice.

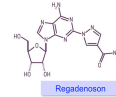
Methods: Between February 2012 and March 2017 we performed a total of 21.286 myocardial radionuclide perfusion scintigraphies with 99m Tc-Tetrofosmin. Thereof we used in 4328 patients (20%) Regadenoson for pharmacological stress testing. The standard dose of 400µg Regadenoson was injected over 20 seconds and after the heart rate increase, 99m Tc-Tetrofosmin was administered. Heart rate, blood pressure and ECG were monitored before and 10 minutes after the injection of Regadenoson. All side effects were documented prospectively.

Results: Abnormal findings in the perfusion scans were found in 16%. The most frequent side effects were shortness of breath (66%), headache (22%), feeling of warmth (21%), feeling of pressure in the chest (18%) and in the „stomach" (17%).

Less frequent side effects were dizziness in 9%, nausea (6%), feeling of general weakness (3%) and sensations in the hands (2%). Very rare side effects were dry throat (0.9%), palpitations (0.9%), severe drop of blood pressure (0.5%), vomiting (0.4%), sweating (0.3%) and 1st degree AV-Block (0.2%). In two patients (0.04%) a life threatening asystole occurred which could be immediately interrupted by administration of Aminophyllin and Atropine. Remarkable, in both patients the ECG before the injection of Regadenoson showed 1st degree AV-Block already.

Conclusion: The life threatening side effect of asystole is very rare (0.04%) and can be rapidly treated with Aminophyllin and Atropine. The official instructions for use mention that a 2nd degree AV-Block is a risk factor for the occurrence of asystole. According to our experience, however, also patients with preexisting 1st degree AV-Block have an increased risk for developing a life threatening asystole.

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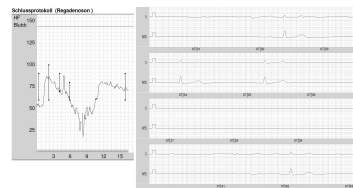


- > Low-affinity / High potency selective A_{2A} adenosine receptor agonist
- > High selectivity
 - At least 10-fold lower affinity for the A₁ receptor
 - Weak, if any, affinity for the A_{2B} and A₃ receptors
- > A_{2A} adenosine receptor activation produces coronary vasodilation and increases coronary blood flow (CBF)

Practice Experience with Regadenoson:
Common Side Effects (4328 Patients)

	Nr. of Patients	Percentage
Shortness of Breath	2840	65.61 %
Headache	948	21.90 %
Feeling of Warmth	892	20.60 %
Pressure in the Chest	796	18.39 %
Pressure in the Stomach	750	17.32 %
Dizziness	374	8.64 %
Nausea	277	6.40 %
Feeling of Weakness	126	2.91 %

Asystole with Regadenoson (< 1 per mill):



Take Home Messages from a Cardiology Practice:

1. Vasodilator stress testing is an important tool for making pivotal clinical decisions.
2. In our practice, appr. 20% of all myocardial perfusion scans are with vasodilatation.
3. Switching from Adenosine to Regadenoson makes sense and was immediately adopted by our nurses and technicians.
4. **General advantages of Regadenoson vs. Adenosine:**
 - > advantage for the patients: less side effects
 - > advantage for nurses / technicians: no dose calculations any more, no syringe pumps necessary
5. **Specific advantages of Regadenoson vs. Adenosine:**

In Nuclear Cardiology:

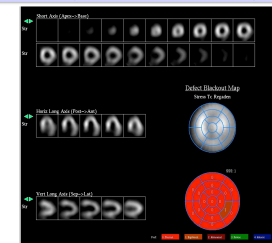
 - > for the patients: discontinuation of drug infusion after ^{99m}Tc injection
 - > for nurses / technicians: easier handling, no stopcocks



Practice Experience with Regadenoson:
Very Rare Side Effects (4328 Patients)

	Nr. of Patients	Percentage
Sensations in the hands	72	1.66 %
Feeling of dry throat	41	0.94 %
Palpitations	41	0.94 %
Drop of blood pressure	21	0.48 %
Vomiting	17	0.39 %
Sweating	13	0.30 %
1 st degree AV-Block	7	0.16 %
Asystole	2	0.04 %

Normal Myocardial Perfusion Scan after Asystole



Recommendations for Precaution with Regadenoson:

1. Continuous monitoring of blood pressure and ECG
2. Follow the contraindications (2nd degree AV-Block).
3. Increased alert for patients with preexisting 1st degree AV-Block
4. Keep the antidote readily available for immediate use:
 - > Aminophylline (Theophylline), 10ml = 200 mg, slowly i.v.
 - > Atropine, 1 ml = 0.5 mg, 1 - 2 vials i.v.
5. Don't put the patient immediately after injection under the camera; Don't remove the injection needle for at least 20 minutes !