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EFFECT OF PENTOXIFYLLINE ON CONTRAST-INDUCED NEPHROPATHY: A SYSTEMATIC REVIEW

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Objectives: Contrast media that was used in diagnostic and interventional procedures provides high risk complication such as Contrast-Induced nephropathy (CIN). Pentoxifylline (PTX), a methylxanthine derivative with multiple hematologic properties, has some anti-inflammatory properties, and there is evidence that PTX also reduces nitric oxide (NO) deterioration. This systematic review evaluates the effect of pentoxifylline on contrast-induced nephropathy.

Methods: We conducted a systematic review of all studies published between 2010 – 2020, on outcome of pentoxifylline on contrast induced nephropathy. Through a comprehensive search on PubMed and Cochrane Library. We identified two eligible studies. Risk of bias analysis was performed using the Cochrane Risk of Bias Tool.

Results: 485 patients were included in our systematic review. 237 patients were treated with pentoxifylline (PTX) (400 mg three times a day on the day of the coronary angioplasty and the day after) and 248 patients were treated with normal saline (1–1.5 cc/kg from 6 h before to 6 h after coronary angioplasty). Serum creatinine was measured 24 h prior to the procedure and 48 h thereafter. The primary endpoint was occurrence of CIN defined as 25 % rise in serum creatinine 48 h after the procedure. CIN occurred in (10.48%) patients in the control group and in 18 (7.59%) patients in the study group. Both studies found the difference between 2 groups were not statistically significant.

Conclusions: Pentoxifylline could be recommended for Contrast-Induced nephropathy (CIN) prevention in patients without renal impairment undergoing angioplasty, although no statistically significant protective effect of Pentoxifylline was documented. Trials in patients with renal impairment are needed to study the role of Pentoxifylline further.

Figure 1. Systematic review flowchart

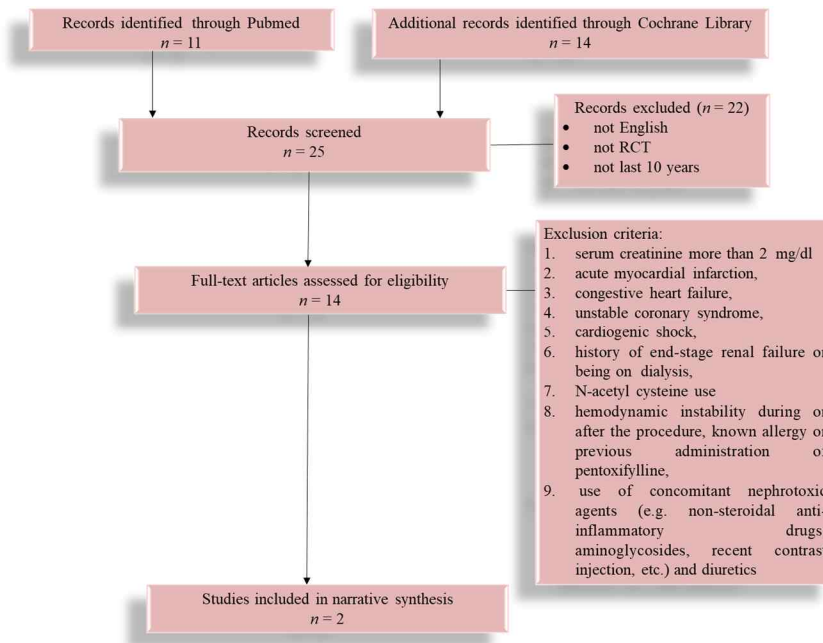


Table 1. Studies included in systematic review

NO	TITLE	AUTHOR (YEAR)	STUDY DESIGN	STUDY POPULATION	INTERVENTION	OUTCOME
1	Efficacy of pentoxifylline in prevention of contrast-induced nephropathy in angioplasty patients	Ata Firouzi, Ali Eshraghi, Farshad Shakeria, Hamid Reza Sanati, Negar Salehi, Ali Zahedmehr, Reza Kiani, Mohsen Madani, Ali Pedarzadeh	prospective, randomized, single-blind, single-center clinical trial	286 consecutive patients undergoing coronary angioplasty	Patients were divided into control group (n = 146), with routine treatment and no PTX, or the study group (n = 140), with routine treatment and PTX, 400 mg/tid from 24 h before to 24 h after coronary angioplasty. Serum creatinine was measured before and 2 days after the procedure. The primary end point was the occurrence of CIN within 48 h.	The control and PTX groups were comparable in the overall predicted risk of CIN. Also, the type and volume of the contrast agent were not significantly different between the two groups. Following angioplasty, CIN occurred in 20 (13.69%) patients in the control group and in 12 (8.5%) patients in the study group; the difference was not statistically significant (P = 0.17). Additionally, there was no mortality and need for hemodialysis in either group.
2	The preventive effect of pentoxifylline on contrast-induced nephropathy: a randomized clinical trial	Vahideh Yavari, Mohammad Ali Ostovan, Javad Kojuri, Raha Afshariani, Alireza Hamidian, Jamshid Roozbeh, Maryam Pakfetrat	a randomized clinical trial	all consecutive eligible patients referred for elective percutaneous coronary intervention were asked to participate in the study (n = 199).	The patients were randomly allocated to two groups either receiving saline or saline plus pentoxifylline 400 mg orally three times a day for 48 h. Serum creatinine was measured 24 h prior to the procedure and 48 h thereafter. The primary endpoint was occurrence of CIN defined as 25 % rise in serum creatinine 48 h after the procedure.	The overall incidence of CIN was 6 % in this study (6.2 % in the PTX group versus 5.9 % in the hydration group, P = 0.92). Absolute rise in serum creatinine was not also significantly different between the two groups (P = 0.97). In hypertensive patients, however, the incidence of CIN was lower among those receiving PTX: 5 % in the PTX group versus 8.7 % in the hydration group. Nevertheless, this difference was not statistically significant (P = 0.68).