

Prevention of different hydration options on cisplatin induced nephrotoxicity: a systematic review and meta analysis

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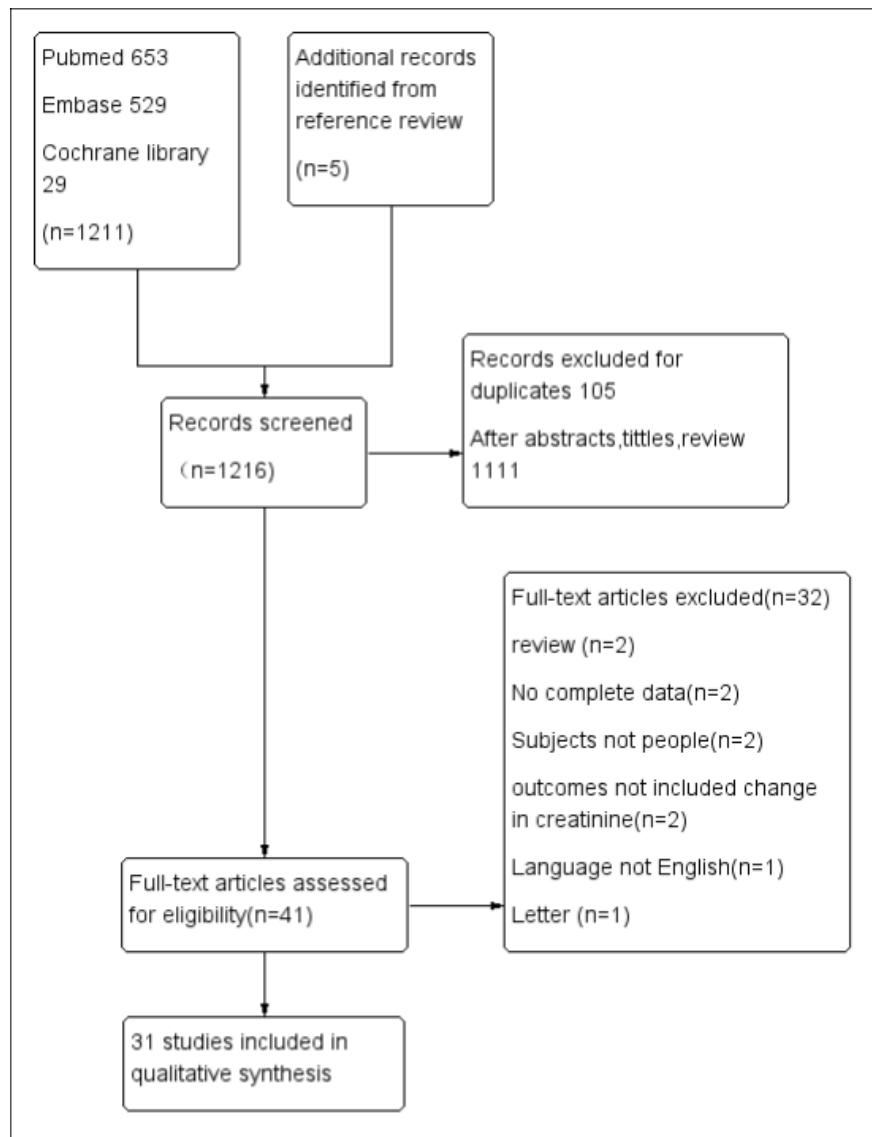
August 17, 2020

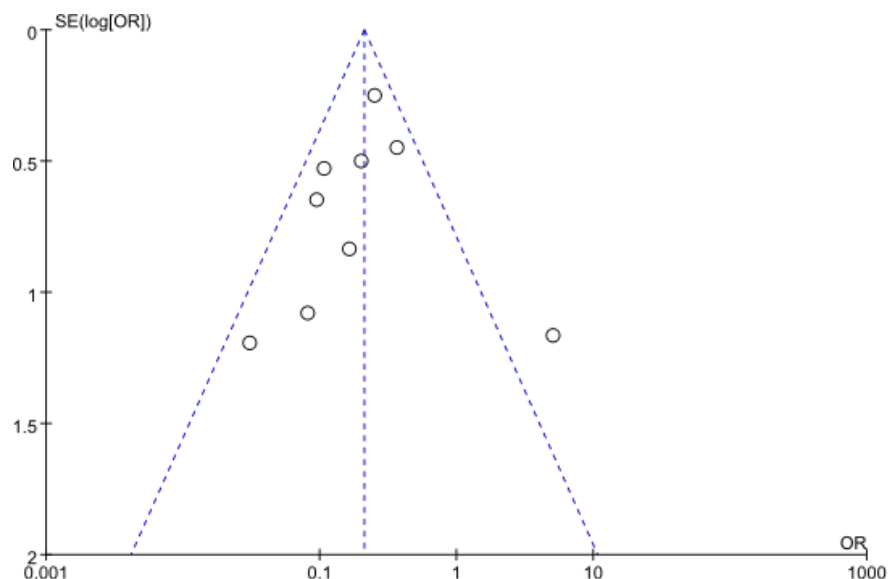
Abstract

Purpose: Cisplatin-induced nephrotoxicity (CIN) is still the most serious side effect limiting the use of cisplatin. It affects up to 20% of patients. So, there are many precautions to avoid it. The purpose of this study was to conduct a systematic review and meta-analysis to evaluate and determine different hydration options that could provide protection against cisplatin-induced nephrotoxicity. **Methods:** A computerized literature search of PubMed, Embase, and Cochrane databases was performed. Trials were eligible if they enrolled patients receiving cisplatin and participants to receive different hydration options to prevent nephrotoxicity. We calculated odds ratios (ORs) and 95% confidence intervals (CIs) for combinations of studies. **Results:** Within 1111 eligible studies, 31 articles fulfilling the selection criteria were included in the review. A meta-analysis could only be performed on the 9 retrospective studies concerning magnesium supplementation, and showed nephroprotective effect of CIN (OR 0.21, [0.59–0.29]). **Conclusion:** Although up to now, there is no one method of prevention that shows its indisputable efficacy, our results highlight the potential protective effect of magnesium supplementation on CIN.

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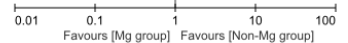




Study or Subgroup	Mg group Events Total	Non-Mg group Events Total	Weight	Odds Ratio M-H, Fixed, 95% CI	Year
Kidera 2014	4 67	123 334	19.8%	0.11 [0.04, 0.31]	2014
Oka 2014	1 44	9 41	4.7%	0.08 [0.01, 0.69]	2014
Yoshida 2014	23 161	133 335	37.9%	0.25 [0.15, 0.41]	2014
Yamamoto 2015	1 14	10 14	4.7%	0.03 [0.00, 0.32]	2015
Yamamoto 2016	11 37	25 37	9.0%	0.20 [0.08, 0.54]	2016
Yamaguchi 2017	9 60	20 62	8.6%	0.37 [0.15, 0.90]	2017
Saito 2017	20 29	27 29	4.3%	0.16 [0.03, 0.85]	2017
Kimura 2018	3 56	24 65	10.8%	0.10 [0.03, 0.34]	2018
Ashraf 2019	4 22	1 24	0.4%	5.11 [0.52, 49.79]	2019
Total (95% CI)	490	941	100.0%	0.21 [0.15, 0.29]	
Total events	76	372			
Heterogeneity: Chi ² = 16.08, df = 8 (P = 0.04); I ² = 50%					
Test for overall effect: Z = 9.49 (P < 0.00001)					



Study or Subgroup	Mg group Events Total	Non-Mg group Events Total	Weight	Odds Ratio M-H, Fixed, 95% CI	Year
3.1.1 cisplatin < 80mg/m²					
Yamamoto 2015	1 14	10 14	4.7%	0.03 [0.00, 0.32]	2015
Yamamoto 2016	11 37	25 37	9.0%	0.20 [0.08, 0.54]	2016
Saito 2017	20 29	27 29	4.3%	0.16 [0.03, 0.85]	2017
Subtotal (95% CI)	32	62	18.0%	0.15 [0.07, 0.32]	
Total events	32	62			
Heterogeneity: Chi ² = 2.14, df = 2 (P = 0.34); I ² = 7%					
Test for overall effect: Z = 4.82 (P < 0.00001)					
3.1.2 80mg/m² < cisplatin < 100mg/m²					
Yoshida 2014	23 161	133 335	37.9%	0.25 [0.15, 0.41]	2014
Oka 2014	1 44	9 41	4.7%	0.08 [0.01, 0.69]	2014
Yamaguchi 2017	9 60	20 62	8.6%	0.37 [0.15, 0.90]	2017
Kimura 2018	3 56	24 65	10.8%	0.10 [0.03, 0.34]	2018
Subtotal (95% CI)	321	503	61.8%	0.23 [0.15, 0.34]	
Total events	36	186			
Heterogeneity: Chi ² = 3.96, df = 3 (P = 0.27); I ² = 24%					
Test for overall effect: Z = 7.31 (P < 0.00001)					
3.1.3 cisplatin ≥ 100mg/m²					
Kidera 2014	4 67	123 334	19.8%	0.11 [0.04, 0.31]	2014
Ashraf 2019	4 22	1 24	0.4%	5.11 [0.52, 49.79]	2019
Subtotal (95% CI)	8	124	20.2%	0.21 [0.10, 0.45]	
Total events	8	124			
Heterogeneity: Chi ² = 9.10, df = 1 (P = 0.003); I ² = 89%					
Test for overall effect: Z = 3.97 (P < 0.0001)					
Total (95% CI)	490	941	100.0%	0.21 [0.15, 0.29]	
Total events	76	372			
Heterogeneity: Chi ² = 16.08, df = 8 (P = 0.04); I ² = 50%					
Test for overall effect: Z = 9.49 (P < 0.00001)					
Test for subgroup differences: Chi ² = 0.96, df = 2 (P = 0.62); I ² = 0%					



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