Improving Management of Acute Kidney Injury Due to Lithium Intoxication: Assessing the Role of ChatGPT-4 in Identifying Lithium Preparations **AKI & CRRT Conference**



Mohammad S. Sheikh, MD¹; Erin F. Barreto, Pharm D²; Benjamin Dreesman, Pharm D², Charat Thongprayoon, MD¹, Fawad M. Qureshi, MD¹, Kianoush B. Kashani, MD^{1,3}, Wisit Cheungpasitporn, MD¹

¹Mayo Clinic Minnesota, Division of Nephrology and Hypertension, ²Mayo Clinic Minnesota, Division of Pharmacy ³Mayo Clinic Minnesota, Division of Pulmonary and Critical Care Medicine

Abstract

This study explores the efficacy of ChatGPT-4, an artificial intelligence model, in identifying lithium preparations to aid in the management of acute kidney injury (AKI) caused by lithium intoxication. The research involved analyzing images of medication, all of which were obtained from the poison control website <u>http://pill-id.webpoisoncontrol.org</u>.

Specifically, 25 images of lithium medications and 25 images of non-lithium medications were processed by ChatGPT-4. The Al's ability to correctly identify medication type, dose, and imprint was assessed.

ChatGPT-4 achieved a 92% accuracy rate in identifying lithium preparations and correctly identified 100% of non-lithium images, demonstrating its effectiveness in distinguishing between lithium and non-lithium medications. However, there were some misidentifications, highlighting the importance of human oversight in the AI-assisted medication identification process.

The study underscores the potential of AI tools like ChatGPT-4 in supporting the management of medication-induced AKI, but also emphasizes the need for cautious integration with human expertise.



Prompt recognition and management of medication intoxications, especially in cases of AKI are crucial. Lithium, a common nephrotoxin, poses significant challenges due to its narrow therapeutic index.

The advent of artificial intelligence (AI) presents a novel tool for rapidly identifying these substances, facilitating timely diagnosis and treatment.

This study assess the capacity of AI models, specifically ChatGPT-5, in distinguishing between lithium and non-lithium medications based on image recognition from the poison control database http://pill-id.webpoisoncontrol.org.

Methods and Materials

This study involved analyzing 25 images of various lithium preparations, detailing the medication type, dose, and an assessment of accuracy. An additional 25 non-lithium medication images were included as controls. All images were obtained from the poison control website http://pill-id.webpoisoncontrol.org.

These images were processed by ChatGPT-4 at a resolution of 200 DPI, and the AI's ability to identify medication type, dose, and imprint was assessed. The performance was benchmarked against verified data from http://pill-id.webpoisoncontrol.org.







Results

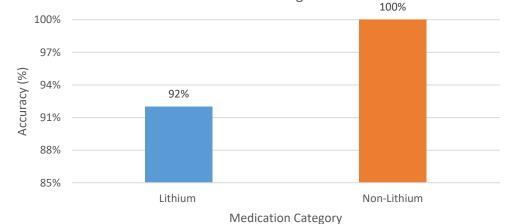
ChatGPT-4 demonstrated a high accuracy rate (92%), correctly identifying 23 of 25 lithium medication preparations (Figure 2), which is critical in managing medication-induced AKI.

ChatGPT-4 accurately identified 100% of the non-lithium medications, indicating its efficacy in distinguishing between lithium and non-lithium medications.

Misidentifications accounted for 8% of the lithium preparations, where specific cases included misidentifying lithium carbonate 600mg with potassium chloride ER 750mg (Figure 3) or lithium carbonate 300mg for bupropion 300mg (Figure 4).

					Non-Lithium Medication		
	Lithium Preparation per Poison Control	Medication per GPT-4		Туре	Imprint per Poison Control	Imprint per GPT-4	GPT-4 Correct vs Incorre
	Lithium Carbonate 600 mg	Lithium Carbonate	600 mg	capsule	54 702	54 702	Correct
	Lithium Carbonate 450 mg	Lithium Carbonate	450 mg	tablet	54 346	54 346	Correct
	Lithium Carbonate 150 mg	Lithium Carbonate	150 mg	capsule	54 213	54 213	Correct
	Lithium Carbonate 300 mg	Lithium Carbonate	300 mg	tablet	54 107	54 107	Correct
	Lithium Carbonate 300 mg	Lithium Carbonate	300 mg	capsule	APO 300	APO 300	Correct
	Lithium Carbonate 600 mg	Lithium Carbonate	600 mg	capsule	G222 600	G222 600	Correct
	Lithium Carbonate 300 mg	Lithium Carbonate	300 mg	capsule	G221 300	G221 300	Correct
5	Lithium Carbonate 300 mg	Lithium Carbonate	300 mg	capsule	West-ward 3189	West-ward 3189	Correct
5	Lithium Carbonate 150 mg	Lithium Carbonate	150 mg	capsule	H 97	H 97	Correct
10	Lithium Carbonate 300 mg	Lithium Carbonate	300 mg	capsule	H 98	H 98	Correct
11	Lithium Carbonate 600 mg	Lithium Carbonate	600 mg	capsule	H 141	H 141	Correct
12	Lithium Carbonate 150 mg	Lithium Carbonate	150 mg	capsule	West-ward 3188	West-ward 3188	Correct
13	Lithium Carbonate ER 450 mg	Lithium Carbonate ER	450 mg	tablet	WW 277	WW 277	Correct
14	Lithium Carbonate ER 300 mg	Lithium Carbonate ER	300 mg	tablet	223	223	Correct
15	Lithium Carbonate ER 450 mg	Lithium Carbonate ER	450 mg	tablet	224 G	224 G	Correct
16	Lithium Carbonate 300 mg	Lithium Carbonate	300 mg	tablet	430	430	Correct
17	Lithium Carbonate 150 mg	Lithium Carbonate	150 mg	capsule	G220 150	G220 150	Correct
18	Lithium Carbonate 300 mg	Lithium Carbonate	300 mg	tablet	54 452	54 452	Correct
19	Lithium Carbonate 300 mg	Lithium Carbonate	300 mg	capsule	54 463	54 463	Correct
20	Lithium Carbonate ER 300 mg	Lithium Carbonate ER	300 mg	tablet	M LC 300	MLC 300	Correct
	Lithium Carbonate ER 300 mg	Lithium Carbonate ER	300 mg	tablet	LITHOBID 300	LITHOBID 300	Correct
	Lithium Carbonate 150 mg	Lithium Carbonate	150 mg	capsule	WW 3188	WW 3188	Correct
	Lithium Carbonate 150 mg	Lithium Carbonate	150 mg	capsule	A101	A101	Correct
	Lithium Carbonate 600 mg	Potassium Chloride ER	750 MG	capsule	A103	A103	Incorrect
25			1300 mg	cansule	A 102	A 102	Incorrect
25	Lithium Carbonate 300 mg	Bupropion	300 mg	capsule	A 102	A 102	Incorrect
25							
	Non-Lithium Medication per Poison Control	Medication per GPT-4	Dose per GPT-4	Туре	A 102 Imprint per Poison Control 952	Imprint per GPT-4	
1	Non-Lithium Medication per Poison Control	Medication per GPT-4 Losartan potassium	Dose per GPT-4 50 mg	Type tablet	Imprint per Poison Control 952	Imprint per GPT-4 952	GPT-4 Correct vs Incorr Correct
1	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Retrolac 10 mg	Medication per GPT-4 Losartan potassium Ketrolac	Dose per GPT-4 50 mg 10 mg	Type tablet tablet	Imprint per Poison Control 952 M 134	Imprint per GPT-4 952 M 134	GPT-4 Correct vs Incorr Correct Correct
1	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Ketrolac 10 mg Simethicone 80 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone	Dose per GPT-4 50 mg 10 mg 80 mg	Type tablet tablet tablet	Imprint per Poison Control 952 M134 44 137	Imprint per GPT-4 952 M134 44 137	GPT-4 Correct vs Incorr Correct Correct Correct
1	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Ketrolac 10 mg Simethicone 80 mg Pantoprazole sodium DR 20 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR	Dose per GPT-4 50 mg 10 mg 80 mg 20 mg	Type tablet tablet tablet tablet	Imprint per Poison Control 952 M134 44.137 93/11	Imprint per GPT-4 952 M 134 44 137 93/11	GPT-4 Correct vs Incorr Correct Correct Correct Correct
	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Ketrolac 10 mg Simethicone 80 mg Pantoprazole sodium DR 20 mg Loperamide HCl 2 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Loperamide HCI	Dose per GPT-4 50 mg 10 mg 80 mg 20 mg 2 mg	Type tablet tablet tablet tablet capsule	Imprint per Poison Control 952 M 134 44 137 93/11 N 020 2	Imprint per GPT-4 952 M134 44 137 93/11 N 020 2	GPT-4 Correct vs Incorr Correct Correct Correct Correct Correct
	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Ketrolas 10 mg Simethicone 80 mg Pantoprazole sodium DR 20 mg Loperamide HCl 2 mg Lisinopri 10 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Loperamide HCI Lisinopril	Dose per GPT-4 50 mg 10 mg 80 mg 20 mg 2 mg 20 mg	Type tablet tablet tablet tablet capsule tablet	Imprint per Poison Control 952 M134 44 137 93/11 N 020 2 3760	Imprint per GPT-4 952 M 134 44 137 93/11 N 020 2 3760	GPT-4 Correct vs Incorr Correct Correct Correct Correct Correct Correct
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	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Ketrolac 10 mg Simethicone 80 mg Pantoprazole sodium DR 20 mg Loperamide HCl 2 mg Lisinopril 20 mg Chlorthalidone 50 mg Furosemide 40 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Loperamide HCI Lisinopril Chiorthalidone Furosemide	Dose per GPT-4 50 mg 10 mg 80 mg 20 mg 2 mg 50 mg 40 mg	Type tablet tablet tablet tablet tablet tablet tablet tablet tablet	Imprint per Poison Control 952 M134 44137 93/11 N020 2 3760 M75 54583	Imprint per GPT-4 952 M134 44 137 93/11 N 020 2 3760 M 75 54 583	GPT-4 Correct vs Incom Correct Correct Correct Correct Correct Correct Correct Correct Correct
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	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Ketrolac 10 mg Simethicone 80 mg Pantoprazole sodium DR 20 mg Loperamide HCI 2 mg Lusinopril 20 mg Chorthalidone 50 mg Furusemide 40 mg Hydrochlorothiazide 25 mg Metoprolol succinate ER 50 mg Applin 325 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Loperamide HCI Lisinopril Chiorthalidone Furosemide Hydrochlorothiazide Metoproloi succinate ER Aspirin	Dose per GPT-4 50 mg 10 mg 80 mg 20 mg 20 mg 40 mg 25 mg 50 mg 40 mg 25 mg 50 mg 325 mg	Type tablet tablet tablet tablet tablet tablet tablet tablet tablet tablet tablet tablet	Imprint per Poison Control 952 M134 44137 93/11 N020 2 3760 M75 54583 LL H14 369 TCL 011	Imprint per GPT-4 952 M134 44 137 93/11 N020 2 3760 M75 54 583 LL H14 369 TCL 011	GPT-4 Correct vs Incorr Correct Correct Correct Correct Correct Correct Correct Correct Correct Correct Correct Correct Correct Correct Correct Correct Correct
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	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Ketrolac 10 mg Simethicone 80 mg Pantoprazole sodium DR 20 mg Loperamide HCI 2 mg Lisinopril 20 mg Chlorthalidone 50 mg Hydrochlorothiazide 25 mg Metoproloi succinate ER 50 mg Aspirin 325 mg Gabapentin 600 mg Calcitriol 0.5 mcg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Loperamide HCI Lisinopril Chlorthalidone Furosemide Hydrochlorothiazide Metoprolol succinate ER Aspirin Gabapentin Calcitriol	Dose per GPT-4 50 mg 10 mg 80 mg 20 mg 20 mg 50 mg 40 mg 50 mg 50 mg 50 mg 50 mg 60 mg 0.5 mcg	Type tablet tablet tablet tablet tablet tablet tablet tablet tablet tablet tablet tablet tablet tablet	Imprint per Poison Control 952 M134 44137 93/11 N020 2 3760 M75 54 583 LL H14 369 TCL 011 6 31 93 558	Imprint per GPT-4 952 M134 44137 93/11 N0202 3760 M75 54583 LLH14 369 TCL011 G31 93658	GPT-4 Correct vs incorr Correct
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1 2 3 3 4 4 5 5 6 6 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Non-Lithium Medication pre Poison Control Losartan potassium 50 mg Ketrolac 10 mg Bantoprazole sodium DR 20 mg Loperamide HCl 2 mg Lisinopri 120 mg Chiorthaildone 50 mg Hydrochiorothiaade 25 mg Hydrochiorothiaade 25 mg Adspirin 325 mg Cabarpin 600 mg Calacitriol 0.5 mcg Caravedilo 125 mg Cinacatest HCl 30 mg Forsemide 100 mg Allopurinol 300 mg Enalagni maleate 10 mg Prazosin 5 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Loperamide HCI Lisinopril Chiorthalidone Hydrochiorothiazide Hydrochiorothiazide Metoprolol succinate ER Aspirin Gabapentin Calcitriol Carvedilol Cinacalcet Torsemide Allopurinol Enalapril maleate Prazosin	Dose per GPT-4 50 mg 50 mg 10 mg 80 mg 20 mg 20 mg 30 mg 20 mg 325 mg 600 mg 0.5 mcg 25 mg 30 mg 100 mg 300 mg 10 mg 5 mg	Type [tablet tablet	Imprint per Poison Control 952 M134 44137 93/11 N0202 3760 M75 54583 LLH14 369 TCL011 G31 93658 R255 WP116 par 654 MP80 ME17 934069	Imprint per GPT-4 952 M134 44 137 93/11 N0202 3760 M75 54 583 ULH 14 369 TCL 011 G 31 93 658 R255 WP116 par 654 MP 80 ME17 93 4069	GPT-4 Correct vs incorr Correct
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11 2 3 3 5 5 6 6 6 6 6 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Simethicone 80 mg Pantoprazole sadium DR 20 mg Loperamide HCI 2 mg Lisinopril 20 mg Chlorthalidone 50 mg Furosemide 40 mg Hydrochlorothiaide 25 mg Metoprolol succinate ER 50 mg Aspirin 325 mg Cardetillol 25 mg Forsemide 100 mg Balapril madeta 10 mg Prazosin 5 mg Sevelamer HCI 800 mg Spironolattone 100 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Pantoprazole sodium DR Chlorthalidone Furosemide Hydrochlorthizalde Metoproloi succinate ER Aspirin Gabapentin Calcitriol Carvediloi Cinacalcet Torsemide Allopurinol Enalaprii maleate Prazosin Sevelamer Spironolactone	Dose per GPT-4 S0 mg 50 mg 10 mg 80 mg 20 mg 20 mg 30 mg 325 mg 600 mg 0.5 mcg 25 mg 300 mg 100 mg 5 mg 800 mg 10 mg 5 mg 800 mg 100 mg	Type tablet	Imprint per Poison Control 952 M134 44 137 93/11 N 020 2 3760 M75 54 583 LL H 14 369 TCL 011 6 31 93 658 R 255 WPI 16 par 654 MP 80 ME17 93 4069 6 447 6 5013	Imprint per GPT-4 952 M134 44137 93/11 N0202 3760 M75 54583 LL H14 369 TCL 011 631 93 658 R255 WP116 par 654 MP80 ME17 93 4069 6447 6 5013	GPT-4 Correct vs incorr Correct
	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Exterolac 10 mg Jamethicone 80 mg Pantoprazole sodium DR 20 mg Loperamide HCI 2 mg Lisinopril 20 mg Chiorthaildone 50 mg Furosemide 40 mg Hydrochiorothiarde 25 mg Metoprolol succinate ER 50 mg Applin 325 mg Gabapentin 600 mg Calcitrol 0.5 mcg Calcitrol 0.5 mcg Calcitrol 0.5 mcg Calcatel HCI 30 mg Forsemide 100 mg Allopurinol 300 mg Enalagril maleate 10 mg Prazosin 5 mg Sewelamer HCI 800 mg Spironolactone 100 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Loperamide HCI Lisinopril Chiorthalidone Furosemide Hydrochiorthiazide Metoprolol succinate ER Aspirin Gabapentin Calcitriol Carvedilol Cinacalcet Torsemide Allopurinol Enalapril maleate Prazosin Sevelamer Spironolactone	Dose per GPT-4 50 mg 10 mg 80 mg 20 mg 20 mg 30 mg 25 mg 300 mg 100 mg 300 mg 10 mg 800 mg 100 mg 100 mg 5 mg 800 mg 5 mg	Type tablet	Imprint per Poison Control 952 M134 44137 93/11 N020 2 3760 M75 54 583 LL H14 369 TCL 011 G 31 93 658 R255 WP116 par 654 MP80 MF17 93 4069 G 447 G 5013 G 61330 5	Imprint per GPT-4 952 M134 44 137 93/11 N0202 3760 M75 54 583 LLH 14 369 75C0111 G 31 93 658 R255 WP116 par 654 MP80 ME17 93 4069 G 447 G 5013 G 1530 5	GPT-4 Correct vs incorr Correct
	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Simethicone 80 mg Pantoprazole sadium DR 20 mg Loperamide HCI 2 mg Lisinopril 20 mg Chlorthalidone 50 mg Furosemide 40 mg Hydrochlorothiaide 25 mg Metoprolol succinate ER 50 mg Aspirin 325 mg Cardetillol 25 mg Forsemide 100 mg Balapril madeta 10 mg Prazosin 5 mg Sevelamer HCI 800 mg Spironolattone 100 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Pantoprazole sodium DR Chlorthalidone Furosemide Hydrochlorthizalde Metoproloi succinate ER Aspirin Gabapentin Calcitriol Carvediloi Cinacalcet Torsemide Allopurinol Enalaprii maleate Prazosin Sevelamer Spironolactone	Dose per GPT-4 S0 mg 50 mg 10 mg 80 mg 20 mg 20 mg 30 mg 325 mg 600 mg 0.5 mcg 25 mg 300 mg 100 mg 5 mg 800 mg 10 mg 5 mg 800 mg 100 mg	Type tablet	Imprint per Poison Control 952 M134 44 137 93/11 N 020 2 3760 M75 54 583 LL H 14 369 TCL 011 6 31 93 658 R 255 WPI 16 par 654 MP 80 ME17 93 4069 6 447 6 5013	Imprint per GPT-4 952 M134 44137 93/11 N0202 3760 M75 54583 LL H14 369 TCL 011 631 93 658 R255 WP116 par 654 MP80 ME17 93 4069 6447 6 5013	GPT-4 Correct vs incorr Correct
1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	Non-Lithium Medication per Poison Control Losartan potassium 50 mg Exterolac 10 mg Jamethicone 80 mg Pantoprazole sodium DR 20 mg Loperamide HCI 2 mg Lisinopril 20 mg Chiorthaildone 50 mg Furosemide 40 mg Hydrochiorothiarde 25 mg Metoprolol succinate ER 50 mg Applin 325 mg Gabapentin 600 mg Calcitrol 0.5 mcg Calcitrol 0.5 mcg Calcitrol 0.5 mcg Calcatel HCI 30 mg Forsemide 100 mg Allopurinol 300 mg Enalagril maleate 10 mg Prazosin 5 mg Sewelamer HCI 800 mg Spironolactone 100 mg	Medication per GPT-4 Losartan potassium Ketrolac Simethicone Pantoprazole sodium DR Loperamide HCI Lisinopril Chiorthalidone Furosemide Hydrochiorthiazide Metoprolol succinate ER Aspirin Gabapentin Calcitriol Carvedilol Cinacalcet Torsemide Allopurinol Enalapril maleate Prazosin Sevelamer Spironolactone	Dose per GPT-4 50 mg 10 mg 80 mg 20 mg 20 mg 30 mg 25 mg 300 mg 100 mg 300 mg 10 mg 800 mg 100 mg 100 mg 5 mg 800 mg 5 mg	Type tablet	Imprint per Poison Control 952 M134 44137 93/11 N020 2 3760 M75 54 583 LL H14 369 TCL 011 G 31 93 658 R255 WP116 par 654 MP80 MF17 93 4069 G 447 G 5013 G 61330 5	Imprint per GPT-4 952 M134 44 137 93/11 N0202 3760 M75 54 583 LLH 14 369 75C0111 G 31 93 658 R255 WP116 par 654 MP80 ME17 93 4069 G 447 G 5013 G 1530 5	GPT-4 Correct vs incorr Correct

Accuracy of GPT-4 in Identifying Lithium vs Non-Lithium **Medication Images**



Conclusions



ChatGP1

fiable by the imprint "54 702" on the capsule. Thi oblong-shaped pill is supplied by Hikma ceuticals PLC. Lithium Carbonate is p oaffective Disorder, and Mania, and it falls under the drug is of antimanic agents [1] [1].

Figure 2. Correct Capsule Identification Figure 3. Incorrect Capsule Identification Figure 4 Incorrect Capsule Identification

This study highlights the potential of ChatGPT-4 as an innovative tool in the rapid identification of nephrotoxic drugs or those cleared by the kidney, leveraging images from a poison control database. The high accuracy rate of ChatGPT-4 in identifying various lithium preparations underscores its utility in enhancing the management of drug-induced AKI, particularly in the context of lithium intoxication. Despite its promising performance, the occasional misidentifications stress the importance of integrating AI-assisted drug identification with human expertise to ensure accuracy and safety in clinical decision making.

