Drug Pattern Study Of Allopurinol For Gout Arthritis At Sekip Palembang Health Center

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Keywords: *Gout Arthritis, Allopurinol, Drug Pattern Study*

Abstract: Gout Arthritis is an inflammatory joint disease caused by the deposition of monosodium urate crystals in the joint areas, particularly in the extremities. In the therapeutic process, allopurinol is the first-line choice, especially in asymptomatic hyperuricemia, intercritical, and chronic phases. In Indonesia, there is no data discussing gout arthritis and the study pattern of allopurinol for gout arthritis patients, especially in Palembang, South Sumatra. This study aimed to evaluate the prescribing pattern of allopurinol in gout arthritis patients at Sekip Primary Health Center, Palembang. A retrospective descriptive drug utilization study was conducted using secondary data from medical records between July 1, 2021 and June 30, 2022. Total sampling was applied, and 101 eligible patients were included. The majority of patients were male (61.3%) and elderly (50.5%). The appropriateness of allopurinol use was assessed based on diagnosis, indication, dosage, frequency, duration, and potential drug interactions. Most prescriptions were appropriate in terms of diagnosis (96.1%) and indication (96.1%), with all patients receiving correct dosage and frequency (100%). The majority received once-daily dosing (53.5%) and treatment duration of less than two weeks (81.2%). Drug interactions were identified in a small proportion of cases. In conclusion, allopurinol prescribing patterns were generally appropriate; however, some cases lacked supporting laboratory evaluation prior to therapy initiation. Strengthening adherence to clinical guidelines is recommended.

1 INTRODUCTION

Gout arthritis is a joint disease caused by the deposition of monosodium urate crystals in the joints, particularly in the extremities (Danve & Neogi, 2020; Zhang et al., 2023). Its prevalence is three to four times higher compared to rheumatism and occurs more frequently in adult males than in females, with a ratio of 3:1 (Perhimpunan Reumatologi Indonesia, 2018). According to the ACR/EULAR, the global prevalence of gout is approximately 10% (FitzGerald et al., 2020). Meanwhile, in South Sumatra Province, the prevalence is reported to be 6.48% (Riskesdas DKI Jakarta, 2018).

Allopurinol is the first-line treatment of choice for managing gout, particularly in the non-acute phase (Qurie et al., 2023). In acute phases, if patients have already been receiving routine allopurinol therapy, its administration may be continued (Robinson & Stamp, 2016).

However, the prescribing pattern of allopurinol among clinicians remains irrational, and the limited information regarding gout arthritis continues to pose challenges (FitzGerald et al., 2020). This condition disrupts daily activities and reduces productivity, particularly among adult patients. Moreover, inappropriate prescribing contributes to the increasing economic burden of degenerative disease treatment for the country (Mak et al., 2019).

Therefore, further research is needed to evaluate the rational use of allopurinol in gout arthritis patients, including accuracy of diagnosis, indication, dosage, frequency of administration, duration of treatment, and potential drug interactions. This study was conducted to investigate the prescribing pattern of allopurinol in gout arthritis patients at Sekip Primary Health Center, Palembang, during the period of July 1, 2021 – June 30, 2022.

2 METHODS

This study employed a retrospective descriptive design to evaluate the prescribing pattern of allopurinol in gout arthritis patients. The study used secondary data obtained from medical records at Sekip Primary Health Center, Palembang, covering the period from July 1, 2021 to June 30, 2022. The study

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DRUG PATTERN STUDY OF ALLOPURINOL FOR GOUT ARTHRITIS AT SEKIP PALEMBANG HEALTH CENTER.
3rd International Conference on Medical Science and Health (ICOMESH 2025), pages 92–96.

population consisted of all patients diagnosed with gout arthritis who received allopurinol therapy during the study period. A total sampling technique was applied. Inclusion criteria were: (1) patients aged ≥18 years, (2) patients diagnosed with gout arthritis and prescribed allopurinol, and (3) patients with complete and legible medical records. Exclusion criteria included patients with a history of kidney stones or chronic kidney disease, and records with incomplete or unreadable data.

The diagnosis of gout arthritis was based on clinical diagnosis documented by physicians in the medical records, with or without laboratory confirmation of serum uric acid levels. Data completeness was assessed based on the availability of key variables, including patient demographics, diagnosis, drug regimen, and clinical documentation. Records that did not meet these criteria were excluded from analysis. The prescribing pattern of allopurinol was evaluated based on the appropriateness of diagnosis, indication, dosage, frequency of administration, duration of therapy, and potential drug interactions. The appropriateness criteria were determined according to established clinical guidelines, particularly the American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) 2020 guidelines.

Drug interactions were identified and classified as antagonistic, potentiating, or synergistic based on pharmacological references. All data were analyzed descriptively using Statistical Product and Service Solutions (SPSS) version 22 and presented in the form of frequency distribution tables.

3 RESULTS

A total of 107 medical records were identified during the study period. After applying the inclusion and exclusion criteria, 101 patients were included in the analysis, while 6 records were excluded due to incomplete or illegible data. The majority of patients were male (61.3%), while females accounted for 38.7%. Based on age distribution, most patients were classified as elderly (50.5%), followed by pre-elderly (30.6%) and adults (18.9%).

Table 1. Characteristics of Gout Arthritis Patients at Sekip Primary Health Center, Palembang, July 1, 2021 – June 30, 2022

Variable	N	%
Sex		
Male	62	61,3
Female	39	38,7
Age		
Adult	19	18,9
Pre-elderly	31	30,6
Elderly	51	50,5
Total	**101**	**100**

The evaluation of allopurinol prescribing patterns showed that the diagnosis was appropriate in 96.1% of cases, while 3.9% were considered inappropriate. Similarly, the indication for allopurinol therapy was appropriate in 96.1% of patients.

All patients received appropriate dosage and dosing frequency (100%). The most common dosing regimen was once daily (53.5%), followed by twice daily (40.6%) and three times daily (5.9%). Regarding treatment duration, the majority of patients received allopurinol for less than two weeks (81.2%), while 18.8% received therapy for two weeks or longer. A total of 187 drug combinations were identified. Most prescriptions showed no clinically significant drug interaction (94.1%), while a small proportion (5.9%) involved potential interactions, including antagonistic, potentiating, and synergistic effects.

Table 2. Patterns of Allopurinol Use in Gout Arthritis Patients at Sekip Primary Health Center, Palembang, July 1, 2021 – June 30, 2022

Variable	N	%
Accuracy of Diagnosis		
Accurate	97	96,1
Inaccurate	4	3,9
Accuracy of Indication		
Appropriate	97	96,1
Inappropriate	4	3,9
Accuracy of Dosage		
Correct	101	100
Incorrect	0	0,0
Frequency of Administrati		
Once daily	54	53,5
Twice daily	41	40,6
Three times daily	6	5,9
Duration of Therapy		
< 2 weeks	82	81,2
≥ 2 weeks	19	18,8
Drug Interactions		
Antagonistic	1	0,54
Potentiating	1	0,54
Synergistic	9	4,81
No Interaction	176	94,1

4 DISCUSSION

This study demonstrated that gout arthritis patients receiving allopurinol at Sekip Primary Health Center were predominantly male and elderly. The higher prevalence in males may be associated with lower estrogen levels compared to females. Estrogen plays a role as an anti-inflammatory agent by suppressing macrophage activity during inflammation and contributes to increased uric acid excretion (Eun et al., 2021). In addition, estradiol enhances uric acid elimination through upregulation of the ABCG2 transporter via activation of the PI3K/Akt signaling pathway (Dalbeth et al., 2019; Liu et al., 2021).

The predominance of elderly patients in this study is consistent with previous findings indicating that aging is associated with a decline in renal function, particularly in uric acid excretion (Fam, 2011). Furthermore, elderly individuals are more likely to have comorbid conditions such as obesity, insulin resistance, diabetes mellitus, and metabolic syndrome, which are known risk factors for gout arthritis (Bechtold et al., 2006; Scheen, 2005). Obesity is also associated with increased levels of pro-inflammatory cytokines, including IL-5, IL-10, IL-12, IL-13, IFN-γ, and TNF-α, which may contribute to joint inflammation and gout attacks (Bai et al., 2021; Gong et al., 2020).

The findings showed that most prescriptions were appropriate in terms of diagnosis and indication. However, a small proportion of cases were classified as inappropriate, which may be related to the absence of supporting laboratory examinations, particularly serum uric acid measurements prior to the initiation of therapy. According to the American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) guidelines, serum uric acid evaluation is recommended to support diagnosis and guide treatment decisions (FitzGerald et al., 2020).

All patients in this study received appropriate dosage and dosing frequency, which were consistent with established recommendations. The initial dose of allopurinol typically starts at 100 mg/day and may be titrated up depending on disease severity and patient response (FitzGerald et al., 2020). This finding suggests good adherence to dosing guidelines among prescribers in this primary care setting.

The majority of patients received allopurinol for less than two weeks. According to ACR/EULAR guidelines, allopurinol is generally used as a long-term urate-lowering therapy, and treatment duration may extend for several weeks or longer depending on clinical response (FitzGerald et al., 2020). Therefore, the short duration observed in this study may reflect limitations in documentation or variations in prescribing practices in primary care settings.

Most prescriptions did not involve clinically significant drug interactions. However, a small proportion of potential interactions were identified. Concomitant use of allopurinol and amoxicillin has been associated with an increased risk of skin rash, although the exact mechanism remains unclear. Previous studies reported that patients receiving both drugs had a higher incidence of rash compared to those receiving amoxicillin alone (Boston Collaborative Drug Surveilance Program, 1972; Jick & Porter, 1981).

In addition, diuretics such as furosemide may increase serum uric acid levels by reducing renal excretion, thereby potentially counteracting the therapeutic effect of allopurinol (Yamamoto et al., 2001). These diuretics may also inhibit uric acid transporters such as Multidrug Resistance Protein 4 (MRP4), further decreasing uric acid excretion (El-Sheikh et al., 2008).

A potential synergistic effect was observed with metformin, which has been reported to exert anti-inflammatory effects through activation of AMP-activated protein kinase (AMPK) and inhibition of the mTOR pathway (Salvatore et al., 2020; Vazirpanah et al., 2019). In addition, metformin may indirectly reduce uric acid levels by improving insulin sensitivity and decreasing lipolysis (Facchini et al., 1991; Simão et al., 2012).

Overall, the prescribing pattern of allopurinol in this study was generally consistent with clinical guidelines. However, incomplete diagnostic evaluation in some cases highlights the need for improved adherence to comprehensive clinical assessment before initiating therapy.

This study has several limitations. First, the use of retrospective secondary data may introduce information bias due to incomplete or inconsistent medical records. Second, the diagnosis of gout arthritis was based on clinical documentation, with limited laboratory confirmation in some cases. Third, this study was conducted in a single primary health care center, which may limit the generalizability of the findings. Future studies using prospective designs and standardized diagnostic criteria are recommended to provide more robust evidence.

5 CONCLUSIONS

In conclusion, the prescribing pattern of allopurinol in this study was generally consistent with clinical guidelines in terms of dosage and administration. However, some cases showed inappropriate diagnosis and indication, particularly due to the absence of supporting laboratory evaluation. This study has several limitations, including the use of

secondary data, potential incompleteness of medical records, and the absence of laboratory confirmation in some cases. Future studies using prospective designs and standardized diagnostic criteria are recommended.

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42/

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