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Comparison of different doses of aspirin on renal function in elderly patients

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Abstract
Low dose aspirin has been reported to be a risk factor of hyperuricemia. Hence this study was planned to study the effect of low dose aspirin compromises renal function, and if so, to alert practicing physicians on the need to show preference when prescribing this drug.
The study had been conducted in IGIMS, Patna on total 60 patients. Group I received 100 mg/day Aspirin for 4 weeks and Group II received 300 mg/day Aspirin for 4 weeks.
Hence it can be concluded that a dosage of 300 mg/day aspirin was found to induce a considerably higher changes in renal function and secretion of uric than 100 mg/day. The dosage of 100 mg/day aspirin can be used with more safety during the treatment. The observation, however, did not propose overlooking a vigilant laboratory investigation when low dose aspirin is added to therapy in order to ensure their safety.

Keywords: low dose aspirin, renal function, uric acid, creatinine etc.

Introduction
Renal function, in nephrology, is an indication of the state of the kidney and its role in renal physiology. Glomerular filtration rate (GFR) describes the flow rate of filtered fluid through the kidney. Creatinine clearance rate (CCr or CrCl) is the volume of blood plasma that is cleared of creatinine per unit time and is a useful measure for approximating the GFR. Creatinine clearance exceeds GFR due to creatinine secretion, [citation needed] which can be blocked by cimetidine. In alternative fashion, overestimation by older serum creatinine methods resulted in an underestimation of creatinine clearance, which provided a less biased estimate of GFR. Both GFR and CCr may be accurately calculated by comparative measurements of substances in the blood and urine, or estimated by formulas using just a blood test result (eGFR and eCCr).The results of these tests are used to assess the excretory function of the kidneys. Staging of chronic kidney disease is based on categories of GFR as well as albuminuria and cause of kidney disease [1].
Dosage of drugs that are excreted primarily via urine may need to be modified based on either GFR or creatinine clearance.

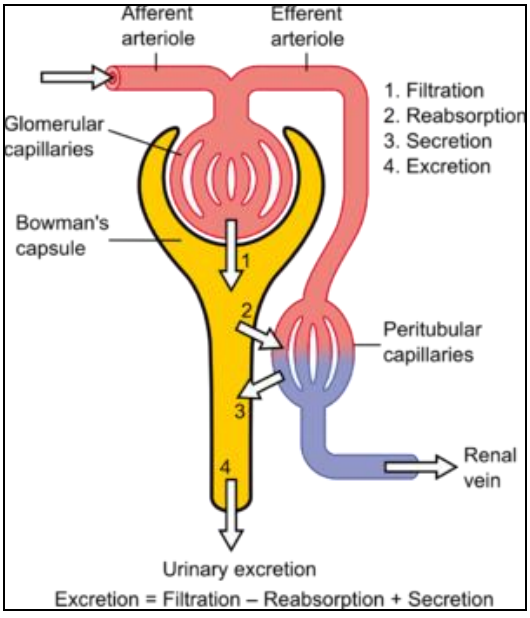

Fig 1: Diagram showing the basic physiologic mechanisms of the kidney

In clinical practice, however, creatinine clearance or estimates of creatinine clearance based on the serum creatinine level are used to measure GFR. Creatinine is produced naturally by the body (creatinine is a breakdown product of creatine phosphate, which is found in muscle). It is freely filtered by the glomerulus, but also actively secreted by the peritubular capillaries in very small amounts such that creatinine clearance overestimates actual GFR by 10% to 20%. This margin of error is acceptable, considering the ease with which creatinine clearance is measured. Unlike precise GFR measurements involving constant infusions of inulin, creatinine is already at a steady-state concentration in the blood, and so measuring creatinine clearance is much less cumbersome. However, creatinine estimates of GFR have their limitations. All of the estimating equations depend on a prediction of the 24-hour creatinine excretion rate, which is a function of muscle mass which is quite variable. One of the equations, the Cockcroft and Gault equation (see below) does not correct for race. With a higher muscle mass, serum creatinine will be higher for any given rate of clearance.

The normal range of GFR, adjusted for body surface area, is 100 mL/min/1.73m2 to 130 mL/min/1.73m2 in men and 90 mL/min/1.73m2 to 120 ml/min/1.73m2 in women younger than the age of 40. In children, GFR measured by inulin clearance is 110 mL/min/1.73 m2 until 2 years of age in both sexes, and then it progressively decreases. After age 40, GFR decreases progressively with age, by about 0.4 mL/min to 1.2 mL/min per year.

Risk factors for kidney disease include diabetes, high blood pressure, family history, older age, ethnic group and smoking. For most patients, a GFR over 60 mL/min/1.73m2 is adequate. But significant decline of the GFR from a previous test result can be an early indicator of kidney disease requiring medical intervention. The sooner kidney dysfunction is diagnosed and treated the greater odds of preserving remaining nephrons, and preventing the need for dialysis.

Aspirin, also known as acetylsalicylic acid (ASA), is a medication used to treat pain, fever, or inflammation. Specific inflammatory conditions in which aspirin is used include Kawasaki disease, pericarditis, and rheumatic fever. Aspirin given shortly after a heart attack decreases the risk of death. Aspirin is also used long-term to help prevent heart attacks, ischaemic strokes, and blood clots, in people at high risk. Aspirin may also decrease the risk of certain types of cancer, particularly colorectal cancer. For pain or fever, effects typically begin within 30 minutes. Aspirin is a nonsteroidal anti-inflammatory drug (NSAID) and works similar to other NSAIDs but also suppresses the normal functioning of platelets [2].

Common side effects include an upset stomach. More significant side effects include stomach ulcers, stomach bleeding, and worsening asthma. Bleeding risk is greater among those who are older, drink alcohol, take other NSAIDs, or are on blood thinners. Aspirin is not recommended in the last part of pregnancy. It is not generally recommended in children with infections because of the risk of Reye's syndrome. High doses may result in ringing in the ears [2].

Aspirin and other NSAIDs can cause abnormally high blood levels of potassium by inducing a hyporeninemic hypoaldosteronism state via inhibition of prostaglandin synthesis; however, these agents do not typically cause hyperkalemia by themselves in the setting of normal renal function and euvolemic state [3].

Low dose aspirin has been reported to be a risk factor of hyperuricemia. Hence this study was planned to study the effect of low dose aspirin compromises renal function, and if so, to alert practicing physicians on the need to show preference when prescribing this drug.

Methodology

The study had been conducted in IGIMS, Patna on total 60 patients who were referred to Out-Patient Department (OPD) and in-patient department (IPD). All the patients are informed consent and the permission of the institutional ethical committee was taken.

Group I: received 100 mg/day Aspirin for 4 weeks

Group II: received 300 mg/dayAspirin for 4 weeks

Following was the exclusion criteria for the study group: Patients having history of

- Urinary tract infection (UTI),
- Renal stone,
- Hematuria, and
- Renal stones

Clearances of creatinine, uric acid and urea were calculated as the products of urine concentrations and 24-hour urine collection divided by the serum concentrations and expressed as ml/min.

Results and Discussion

The data from the both the study group was collected and presented as below.

Table 1

	Group I: received 100 mg/day Aspirin		**Group II: received300 mg/dayAspirin**	
	Baseline	**After 4 weeks**	**Baseline**	**After 4 weeks**
Serum Uric Acid (mg/dl)	5.13±1.10	5.05±1.05	5.015±1.08	5.28±1.02
Fractional Excretion of Uric Acid(mg/dl	46±12	32±9	41±11	21±8.5
Uric Acid Clearance (ml/min)	8.5±1.4	7.4±1.3	8.5±1.3	7.1±1.4
Serum Creatinine (mg/dl)	1.08±0.25	1.04±.20	0.95±0.15	1.1±0.18
Urine Creatinne (mg/dl)	128±25	125±24	110±12	97±12
CrCl (ml/min)	106±15	105±13	108±12	96±10
Serum Urea (mg/dl)	29±6	31±7	29.7±4.8	31.5±3.9
Urine Urea (mg/dl)	1850±315	1830±310	1815±385	1670±250

The dose of 100 mg/d of aspirin did not significantly affectserum uric acid, creatinine and urea levels, whereas it significantly decreased by 21% and6.74% 24h urinary uric acid fraction and uricacid clearance rate respectively. While 300 mg/d aspirin, caused a significant elevation in serum uric acid, creatinine and urea levels, with a significant reduction in the 24h-urinary fractional excretion, and the 24 urine uric acid, creatinine clearance.

Comparing our results with those of previous studies, Louthrenoo *et al*. [4] found that both 300 mg/d and 60 mg/d doses of aspirin decreased the fractional excretion of uric acidafter 2 weeks of therapy. A relatively significant decreased uric acid clearance and creatinine clearance was found in those who were on 300 mg/day aspirin therapy only. While serum creatinine and uric acid concentration, remained stable during both drug administration periods. The important differences between these studies included aspirin dosages and duration of therapy.

A related result on the effects of the current low dose aspirin regimens (75–325 mg/day) for cardiovascular disease prevention were previously studied in two groups of elderly patients [5-6]. They found that these doses of aspirin were capable of inducing a significant decrease in both creatinine and uric acid excretion within 1–2 weeks. One week after the drug was withdrawn, uric acid excretion returned to normal while creatinine clearance remained low. In another trial Segal *et al*. [6] reported that Mini-dose aspirin, even at a dosage of 75 mg/day, caused significant changes in renal function and UA handling within 1 week in a group of elderly inpatients, mainly in those with preexistinghypoalbuminemia. In contrast, when Low doses (100 mg/ day) of aspirin were administered in gouty arthritis patients treated with allopurinol or benzbromarone for 4 weeks did not influence serum uric acid level or urinary uric acid excretion [7].

Conclusion

Hence it can be concluded that a dosage of 300 mg/day aspirin was found to induce a considerably higher changes in renal function and secretion of uric than 100 mg/day. The dosage of 100 mg/day aspirin can be used with more safety during the treatment. The observation, however, did not propose overlooking a vigilant laboratory investigation when low dose aspirin is added to therapy in order to ensure their safety.

Reference

1. Aspirin. Drugs.com. American Society of Health-System Pharmacists. Archived from the original, 2016-2017.
2. Patrignani P, Patrono C. Aspirin and Cancer. Journal of the American College of Cardiology. 2016; 68(9):967-76. PMID 27561771. doi:10.1016/j.jacc.2016.05.083
3. https://en.wikipedia.org/wiki/Renal_function
4. Louthrenooo W, Kasitanonn N, Wichainum R, Sukitawut W. Effect of minidse aspirin on renal function and uric acid handling in healthy young adults. J ClinRheumatol. 2002; 8:299-304.
5. Caspi D, Lubart E, Graff E, *et al*. The effect of mini-dose aspirin on renal function and uric acid handling in elderly patients. Arthritis Rheum. 2000; 43:103-108.
6. Segal R, Lubart E, Leibovitz A, *et al*. Early and late renal effects of mini-aspirin in elderly patients. Am J Med. 2004; 115:462-466.
7. Choi HJ, Lee YJ, Park JJ, *et al*. The Effect of Low Dose Aspirin on Serum and Urinary Uric Acid Level in Gouty Arthritis Patients. J Korean Rheum Assoc. 2006; 13(3):203-208.