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Misuse of Pain Killer Drugs (Diclofenac Na) for in Patients with Hyperuricaemia and Other Risk Factors in Al- Najaf Province

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Abstract

Background: Non-Steroidal Anti-Inflammatory Drugs or pain killer drugs have the effect of increasing the levels of plasma uric acid that leads to renal problems as a one of their adverse effects and also associated with a fairly high incidence of renal adverse drug reactions. Uric acid is a byproduct of purine metabolism produced in blood from endogenous purine substances or from the diet. The aim of current study was to study the correlation between the use of pain killer drug and elevation of serum uric acid in patients suffering from pain of a variety of diseases. **Methods**: This study was executed on patients of different ages suffering from pain, attended main hospitals in Al-Najaf province. **Results*:*** The results showed that all risk factors and different diseases had closely the same effects and regarding the range of relationships for using pain killer drugs and increasing uric acid in outpatients suffered from different diseases. The effects of varying ages in these results had obviously appeared through the numbers of patients. The gender (male and female) had different rates about the numbers that they were suffering from different diseases and hyperuricaemia. These results showed significant differences ($p \leq 0.05$) in patients used pain killers with different dosages, but with lowest rates of uric acid in their blood. **Conclusions**: Pain killers are used in patients suffered from different diseases and the hyperuricaemia cases appeared in patients that they were having different diseases. However, there are different effects of different risk factors and diseases noticed between the two genders. Also, there were differences between employed and non-employed patients in case of hyper and hypouricaemia.

Keyword: *Non-Steroidal Anti-Inflammatory Drugs, pain killer, diclofenac Na, renal disease, uric acid, hyperuricaemia, UTI.*

Introduction

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) have the effect of increasing the levels of plasma uric acid, which leads to kidney problems as one of their adverse effects and also associated with a fairly high incidence of renal adverse drug reactions (ADRs). The mechanism of these renal ADRs is due to changes in renal hemodynamics (kidney blood flow), ordinarily mediated by prostaglandins, which are adversely affected by NSAIDs. Prostaglandins normally cause vasodilation of the afferent arterioles of the glomeruli, this helps maintain normal glomerular perfusion and glomerular filtration rate (GFR; an indicator of renal function) [(1)]. Uric acid is a byproduct of purine metabolism produced in blood from endogenous purine substances or from the diet. Alcoholic and high purine-foods consumption, low water consumption and poorly exercising are contributing factors responsible for hyperuricaemia. Its normal level in the blood serum is <7mg/dl in men and <6mg/dl in women, based on the limits of solubility of the monosodium urate in serum at a temperature of 36.8ºC [(2)]. Men have a greater risk of developing hyperuricaemia than women in all age groups although the sex ratio tends to equalize with advanced age [(3)].

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Hyperuricaemia is becoming an increasing problem worldwide with a steady increase in its prevalence [4]. Uric acid is thought to play a pathogenic role in hypertension mediated by several mechanisms such as inflammation, vascular smooth muscle cell proliferation in renal microcirculation, endothelial dysfunction and activation of the renin–angiotensin–aldosterone system [5]. An elevation in serum uric acid has been associated with an increased risk of hypertension and 25% to 50% of hypertensive individuals are hyperuricaemic [6]. Therefore, the aim of current study was to study the correlation between the use of pain killer drug and elevation of serum uric acid in patients suffering from pain of a variety of diseases.

Materials and Method

The study was designed to explore the misuse of one of the NSAIDs, diclofenac Na., as a pain killer or an analgesic to treat moderate-severe pains in patients suffering from different diseases (joint insult, arthritis, rheumatoid fever) in association with other diseases (hypertension, renal failure, Urinary Tract Inflammation(UTI) and Diabetes). The total number of patients selected was (1015) with different ages and diseases, divided into groups. The first group included 6090 subjects, of whom 277 were males and 332 were females, with hyperuricaemia. The 2nd group included 406 subjects, of whom 213 were males and 193 were females, with normal or low serum uric acid levels. The study extended from 1st, January 2016 to 15th, August 2017. The data were analyzed statistically with SPSS version 8.0 and expressed as Mean ± SE. In addition, $P \leq 0.05$ has been evaluated as statistically significant [7].

Results

The results shown that all risk factors and different diseases had closely the same effects regarding the range of relationships for using pain killers and increasing uric acid in patients suffering from different diseases [609(101.5±52.78)]. The minimum level had been noticed at age group (11-20) years in which significant differences of patients' numbers who had used pain killers and the same time had hyperuricaemia [(53(1.32±3.86), ($p \geq 0.05$)] greater than others at age more than 51yr [(158(95±7.55)]. In case of the influence of risk factors and different diseases on patients, it was noticed that significant differences regarding gender and residence [(10(5.30±8.09) and 200(33.1±15.57)], respectively.

Data from current study showed that males had higher rates [3(0.5±4.20)] in comparison with lower rates in females of the same factor, while male patients lived in urban of Al-Najaf had have higher rates [83(13.7±3.96)] in comparison with females [62(10.2±2.42)].

If we monitored the effects of different cases of patients' diseases, the results would show high effects appeared in female patients who suffered from joint pain [62(10.2+2.42)]. On other hand, the lower rates of influence appeared in females with diabetes [10(1.4±3.60)]. In terms of employment, in this study hyperuricaemia didn't appear in employed male patients who lived in urban places of Al-Najaf province and using different dosages of pain killers in different diseases [0(0.00±2.20)] so as employed females [3(0.5±1.98)]. The results also revealed higher rates of hyperuricaemia in non-employed female patients who suffered from joint diseases and renal failure [43(7.1±1.41); 28(4.6±0.82)] (Data not shown).

Regarding patients who had hyperuricaemia and suffered from different diseases [406(11.48+53.49)], results shown similar rates of patients numbers [67(1.67+5.59) at age groups (21-30) and (31-40) years. The lower numbers of patients were at age group (1-10) years as [(63(1.57+5.29)] with significant differences ($p<0.05$), while at age more than 51 years appeared the highest numbers of patients [(93(2.32+18.83)]. These results shown significant differences ($p<0.05$) in patients used pain killers with different dosages but with lowest rates of uric acid in their blood, in which there were patients had hypertension [23(4.27+3.28)]. On the other hand, [139(23.15+20.18)] of patients who lived in urban and rural regions of Al-Najaf province.

According to the gender, female patients [57(9.5+7.72)] who were living in urban areas of this province and had hypouricaemia and the same times suffered from different diseases, while the lowest rates of hypouricaemia was noticed in male patients suffered from hypertension with significant differences [6(1.00+0.94); ($p<0.05$)]. They had been monitored in these results didn't appeared any cases in the employers of male patients [0(0.00+0.00)], $p<0.05$. Regarding non-employees female patients who were living in urban regions of the province and had highest ranges of hypouricaemia and used pain killers with different

dosages [45(7.5+6.10)]. If we talked about diseases and correlation with levels of hypouricaemia in patients who took pain killers, we noticed that both employed and non-employed patients had lowest rates in opposite to non-employed females were insulted from arthritis [3(0.5+0.43); 23(1.83+1.62), $p<0.05$)], respectively, (Data not shown).

Discussion

In this study, we used (diclofenac Na) as analgesic to moderate-severe pain in patients suffering from different diseases (joint insults, arthritis and rheumatoid fever), but these patients also had other diseases (renal failure, diabetes and hypertension), so this drug generally was used in this case, in opposing there were group of diseases that cause many troubles for patients such as diabetes, renal failure, hypertension, gout and hyperuricaemia. Elevated levels of uric acid are considered an indicator of etiology of hypertension and gout [8]. Presence of secondary diseases beside the primary diseases that the patients insult from exaggerating these problems, one of them is hyperuricaemia, whereas using this drug assumed increased excretion of uric acid from the body. We found significant differences ($P\leq0.05$) in influencing of numbers of hyperuricemia in patients with old more than with younger ages and this guide to the magnitude of correlation between these rates and one of the risk factors especially (age) in which elderly differ from the newer ages in efficiency of hepatic and renal function, so the elderly have low efficacy of hepatic and renal systems. Also, the tiny ages have development function of them and these causes might lead to these cases. Moreover, there results were in agreement with a previous study [9]. The differences in results between males and females in this study may be due to differences in pharmacokinetic, pharmacodynamics and pathological properties [10]. Also, one of the causes that lead to the elevated levels of plasma uric acid in spite of using medications that decrease these levels may be due to diet as a factor. High intake of dietary purines, high-fructose corn syrup and table sugar can cause increased levels of uric acid [11]. Serum uric acid can be elevated due to reduced excretion by the kidneys and fasting or rapid weight loss can temporarily elevate uric acid levels. These results agreed with [4,5]. On the other hand, another study used the same pain killer drug (Diclofenac Na) and allopurinol leading to hypouricaemia. This is because allopurinol is a medication used to decrease high blood uric acid levels [12]. These results were in agreement with [13].

Conclusion

Pain killers are used in patients suffered from different diseases and the hyperuricaemia cases appeared in patients that they were having different diseases. However, there are different effects of different risk factors and diseases noticed between the two genders. Also, there were differences between employed and non-employed patients in case of hyper and hypouricaemia.

Ethical Clearance: The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

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