METFORMIN MAY PROVE TO BE A MARVELOUS DRUG FARTHER DIABETES

Pranki Shukla
M. Pharma.
Department of Pharmaceutics;
RITM Lucknow (INDIA).

Abstract: The main objective of this study was to explain the metformin as a marvelous drug beyond diabetes. In earlier days, metformin was used to cure diabetes but in recent days metformin shows different pharmacological actions (as an anticancer, as an antiviral, as an antimalarial, in polycystic ovarian syndrome, in nonalcoholic fatty liver disease, as an antiaging, as an anti-inflammatory, in auto immunity, in renal replacement therapy, in hypothyroidism etc.) in living cells. Due to these different many effects of metformin, this biguanide is known as “Sanjivani for human health”.

Keywords: Metformin, therapeutical action, antihyperglycemic, Drugs

INTRODUCTION
This antihyperglycemic drug has brigned the first line oral blood glucose decreasing drug to prevent type 2 diabetes mellitus. The metformin was found from Galega officinalis (called as goat’s rue). In Europe it is known as traditional herbal medicine. The richest source of metformin is guanidine which was shown their blood glucose lowering action in 1918. Metformin were synthesized from guanidine and used to prevent diabetes in the 1920 and 1930, however break offed due to their poisonous effect and enhanced the availability of insulin.

Oral hypoglycemic metformin was rediscovered for the antimalarial drugs in the 1940s, during clinical trials certified beneficial to cure influenza when metformin decreased blood glucose level. Jean Sterne (French physician) was chased this property and described the use of metformin to prevent diabetes in 1957 when metformin accepted limited observation.

The capability of this biguanide to decrease insulin resistance and label adult beginning hyperglycemia without bloat.

1. Metformin as an anti-diabetic agents
The antidiabetic agents (metformin) from category of biguanide can be delivered either in combination with sulfonyl ureas or alone, has been capacious used in Canada and Europe. The mode of action of other biguanide and metformin is not fully understood, yet recent in vivo and in vitro studies certified that metformin may play role in part by both promoting insulin action and enhancing the binding of insulin to its receptor. The rare side effect with metformin is lactic acidosis (Riccardo vigneri)

2. Metformin in renal diseases
Over the past decades this biguanide drug has been the first line treatment for type 2 diabetes mellitus (T2DM) but in recently some years, it has become growingly clear that metformin apply placable pleiotropic effects ahead its prescriptive operation continuing examination centre on a putative assumed beneficial collision of this antidiabetic drug on the kidney.

Both, acute and chronic kidney disease (CKD) there are two crucial renal health matters, frequent outcome in the requirement for often renal replacement therapy (dialysis or transplantation) with a high socio-economic clash for the patients.

Unhappily to date, the therapy directly targeting the kidney is lacking. This antidiabetic drug has been appeared to exert helpful action on chronic kidney injuries. (Raphaëlle Corremans 1, Benjamin A Vervaet 2, Patrick C D’Haese 3, Ellen Neven 4, Anja Verhulst 5)

3. Metformin in polycystic ovarian syndrome
Metformin is used as insulin sensitizer and also reference of certify drug for the prevention of poly cystic ovarian syndrome worldwide. When metformin’s work may be limited mostly by gastrointestinal adverse effects. The treatment for women the myoinositol is a very well recognized food supplement which is based on evidenced. (Fabio facchinetti, Giovanni grandi)

4. Metformin in cancer treatment
In the following types of cancer (prostate, lung, pancreatic, cervical, endometrial, renal, gastric, breast, colorectal and ovarian cancer) metformin has been successfully used. In mechanism of action of metformin the important role plays by adenosine monophosphate (AMP) and activated protein kinase (AMPK).

Anti cancer mechanism of metformin

<table>
<thead>
<tr>
<th>Direct effect</th>
<th>Indirect effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>In direct effect of this anti hyperglycemic drug contain AMPK independent AMPK dependent actions.</td>
<td>Whereas lower in glucose level, insulin like growth factor (IGF-1) level, hyper insulinemia are regarded its indirect effect.</td>
</tr>
</tbody>
</table>

Metformin also lowers both nuclear factor kappa light chain enhancer of activated B-cells (NF-kB) and proinflammatory cytokines and promotes the immune reaction to tumor cells.

5. Metformin as an anti-aging agent
Metformin is erratically suggested to be an anti aging drug established on preclinical procedures with decreasing order numerous retrospective data and organisms on effective health outcome for Type 2 diabetics. (Glossmann H.H. 6 - Lutz O.M.D)

IJRTI2109005 International Journal for Research Trends and Innovation (www.ijrti.org)
6. **Metformin in COVID-19 (as an antiviral)**
A combined therapy of metformin, rivaroxaban, and peginterferon alpha-2a increased the SVR rate and insulin sensitivity of patients with hepatitis C genotype 1 and IR with a good safety profile. (Jian Wu Yu, Li Jie Sun) In pathogenesis of influenza the important role plays by the mammalian target of rapamycin (mTOR) signaling. Aside modulating antibody action for cross preventive immunity against influenza viruses also inhibits mTOR pathway by activating AMPK via liver kinase B1 (LKB1). Additionally the Akt/mTOR pathway plays important roles in MERS-CoV infection. After all this antihyperglycemic drug (metformin) blocks the these pathways fascinating to interprets its role against SARS CoV. (Swati Sharma, Avik Ray et al.)

7. **Metformin as an antimalarial agent**
Different biguanide derivatives are used in hyperglycemia and makaria Eg. 1-1 dimethyl biguanide (metformin), phenyl ethyl biguanide (phenformin), proguanil. Although no common process has been explained in these controversial clinical effects. (Sweeney D, Raymer ML)

8. **Metformin as an anti-inflammatory agent**
The one of the oldest blood sugar decreasing drug metformin, having limited adverse reaction and used as the treatment in people suffering from diabetes. Many studies have highlighted on the anti-inflammatory use of metformin with different mechanisms. Metformin reduces the inflammation in some cases and decreases or removes inflammatory factors via dependant mechanisms and sometimes independent of AMPK at the cellular level through some other ways at the systemic levels. (Ali Hasan Pour, Dehkordi, Amin Hasan Vand)

9. **Metformin as a cardiovascular agent**
The metformin having initial pharmacologic action in antidiabetic treatment without any contraindications, in sight of current randomized trials that have explained beneficial effects in cardiovascular consequences with current classes of antidiabetic therapies. Pharmacological cardiovascular shelter with metformin is helped by three randomized result trials and wealth of examined record. (Alexey V Zilov)

10. **Metformin in non alcoholic fatty liver disease**
Metformin show therapeutic action on lipid handling in the liver cells, and this effect has been appear to be via an AMPK dependent mechanism. Thus metformin is being considered for utilization in non alcoholic fatty liver disease (NAFLD) in children. There was no profit of this antihyperglycemic versus life style development of fatty liver disease in one study. Yet there was a lower in the grade of swelling in the liver concerning biopsy with metformin therapy. In second study found no development in NAFLD in metformin versus placebo however they gather those may have been excessively low given that there were no changes in insulin sensitivity. This effect had been seen in the pilot study. Some study explained metformin versus vitamin E supplement and described that metformin can prevent liver disease yet it is subordinate to vitamin E therapy when taken for a longer time period. (Inas Thomas)

11. **Metformin in weight management**
The use of metformin promotes weight loss by decreasing food intake. During initial treatment of metformin decreases in meal size are noticed. Thus decreasing in meal number continue over time. This study of meal patterns are beneficial because it gives insight into the potential brain division pretentious metformin. (Steven K malin)

**Conclusion**
Metformin is a biguanide antihypertensive drug and have potential advantages over antidiabetic drug. Metformin shows a wide range of pharmacological actions rather than antihyperglycemic. For example, metformin is also used to treat different types of cancers, different types of bacterial and viral infections, PCOS, aging, malaria, inflammatory conditions, weight management and metformin also shows some therapeutic action to treat or prevent corona virus infection.

**REFERENCES**


