Introduction
Identification of modifiable risk factors for stroke is important in secondary prevention from recurrent of stroke and from other vascular event. Some studies regard increased blood level of homocystein is one of the modifiable risk factor for recurrent stroke. [1-4] Prospective studies with assessment of total serum homocystein level before vascular events are more informative than obtained later on because many disease can effect on homocystein readings. [5] The British Regional Heart study, [6] show there is correlation between total homocystein value and recurrence of stroke and other vascular events.

Homocystein is produced from essential amino acid called methionine by process of demethylation. Homocystein is metabolized by either remethylation or transmethylation. [7] So there is other causes of homocystein deficiency like congenital deficiency in enzymes that is needed for metabolism of homocystein and lead to elevated level of homocystein in blood that can contribute to arterial damage and blood clots in blood vessels. Coffee consumption, smoking, renal failure and types of drugs can also effect serum level of homocystein. [8]

This study involved measurement the blood homocystein level at morning after admittance of patients diagnosed TIA, ischemic stroke as well as ICH.

Methods
This cross sectional study, consisted of 100 patients in Al-Hussein teaching Hospital in Al-Muthanna province, Iraq who had been selected randomly after acute onset of cerebrovascular event from July 1, 2018 to January 8, 2020. Those patients diagnosed by assessment of clinical feature depend on National Institute Of Health Stroke Scale (NIHSS) [9] to assess the severity of stroke and using Computed Topography (CT) scan. So ischemic stroke diagnosed if the clinical feature presumed more than (24hours) and CT scan show evidence of early infarction in distribution of cerebral arterial territories. TIA had same feature of acute ischemic stroke but CT scan was normal and duration is less than 24 hours while ICH diagnosis depend mainly on CT scan to detect it.

Baseline data like age, gender, Diabetes mellitus, Hypertension and smoking all was included in Questionnaire list. History of TIA or stroke was registered by depending on self - reported or from medical record in hospitals.

Total homocystein level was done for those stroke patients with routine workup. After fasting overnight, total homocystein level was assessed in morning soon after admittance within about 24 hrs. Later stroke start. The blood sample is kept freezing until centrifuged by using For the analysis, Abbott’s automated immunofluorescence homocystein test (Abbott ImX method, Abbott Laboratories).Normal level of the serum homocystein is below 15 mcmol/L, so higher level of homocystein classified into three categories. [10]
Stoke patient are treated regularly in neurological ward according to guideline when the measured total serum homocystein level >15 mmole, this elevated value, so need to give advice to patients after discharge regarding his diet or supplement with folic acid.

2. Statistical analysis:
All continuous data follow a normal distribution, so mean and standard deviation was used to represent the data. The total plasma homocystein level were presented as charts and tables in simple proportion and comparisons of subgroups were done by using Pearson Chi-square test. Data of the research was analyzed by using SPSS version 23. The statistical significant difference for p-value less than 0.05 was taken at confidence interval of 95%

**Objective of study:** The aim of study to determine that total plasma homocystein is independent risk factors for stroke and its relation to recurrent stroke.

**RESULTS**
A cross sectional hospital based-study was conducted on 100 patients with acute stroke and measured total homocystein level for them. Male:female ratio 1:2:1 and mean age 64.7±11.699. The mean total plasma homocystein level was (20±6.2). It showing that moderate plasma homocystein level was mostly seen in stroke patients. Higher percentage of moderate plasma homocystein level was in those with TIA (88.2%), then in those with ischemic stroke (84.3%) and only (7.7%) in those with hemorrhagic, and this association was statistically highly significant.

<table>
<thead>
<tr>
<th>Total plasma homocystein</th>
<th>CT-based stroke type</th>
<th>Total</th>
<th>Fisher exact test, P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ischemia</td>
<td>TIA</td>
<td></td>
</tr>
<tr>
<td>intermediate</td>
<td>10</td>
<td>0</td>
<td>10.0%</td>
</tr>
<tr>
<td>moderate</td>
<td>59</td>
<td>15</td>
<td>75.0%</td>
</tr>
<tr>
<td>normal</td>
<td>2</td>
<td>1</td>
<td>15.0%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>17</td>
<td>59.163, 0.0001</td>
</tr>
</tbody>
</table>

Recurrent stroke was mostly prevalent in those with intermediate total plasma homocystein (90.9%) while (9.1%) of those had moderate homocystein level, and this association was statistically highly significant.

**DISCUSSION**
This study included 100 acute stroke patients that attend Al-Muthanna hospital/Iraq with Male:Female ratio 1:2:1 and mean age 64.7±11.699. The mean total plasma homocystein level was (20±6.2).
This study show elevated total serum homocystein level for acute ischemic stroke patients and can regarded this as independent risk factors for recurrent stroke and this result are in agreement with a results of [11] who found that total homocystein was above the 75% percent in those with recurrent ischemic stroke and others vascular. But in this study is mainly focusing on total homocystein as risk factors for recurrent stroke. Also the strength of this study that make it difference from others that it show significant differences between an ischemic and the hemorrhagic stroke. This difference mean that elevated level of total homocystein in ischemic stroke is not just a reactionary effect to stroke but can be explained by different vascular pathology between ischemic and hemorrhagic stroke. While [12] and [13] found that no difference in total homocystein value between patients with cerebral infarcts and those with ICH because in their study, the number of intracranial hemorrhage was less.

<table>
<thead>
<tr>
<th>Stroke</th>
<th>Elevation of homocystein test</th>
<th>Total</th>
<th>Fisher exact test, p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Recurrent</td>
<td>0</td>
<td>74</td>
<td>15</td>
</tr>
<tr>
<td>Recurrent</td>
<td>10</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>75</td>
<td>15</td>
</tr>
</tbody>
</table>

|                   |                   |       |                           |
|                   |                   |       | 58.681, 0.0001            |
This study showed elevated total plasma homocysteine is significantly occur with recurrent ischemic stroke and that is agree with comparable to result of (12). Some researchers had found correlation between hyper-homocystenemia and ischemic stroke and its subtype. (12, 18, 19) found that total homocystein level was so elevated in patients with complete middle cerebral artery infarct group than other subtypes which can be due to study done on higher age group patients.

Eikelboom et all (14) found significantly elevated blood homocystein level of arterial occlusion (large or small arteries) in compared with healthy control people. While Tan et al (18) that his study found higher total homocystein value in large-artery infarction as compared with a small-artery strokes in patients.

But the question is still present whether hyper-homocystenemia is risk factor for stroke or only vascular marker? Many study like M cCully KS et al (16) supported that is increased homocysteine value is risk factor for stroke by observation that hyper-homocystenemia due to deficiency in one of the following enzymes (methyleneetetrahydrofolate reductase , MTHF homocysteine methyl transferase , cystathionine synthase) is the causes of serious vascular events(3,17,18,19). Also in many neurological disorders, injury to neurons is mainly by overstimulation by excitatory amino acid like aspartic acid and glutamic acid that can be activated by hyper-homocystenemia.

So all of the above mentioned theory support the pathogenesis of hyper-homocystenemia and that elevated total homocystein is independent risk factors for recurrent stroke. (20)

CONCLUSION

The present data suggest that elevated total homocysteine is an independent risk factor for recurrent stroke. Evaluation of homocysteine may become a part of the routine workup of stroke patients. Elevated homocystein values may easily be reduced by vitamin replacement, and this is important in planning for secondary stroke prevention.

Recommendation

Further studies were needed to more clarifying relationship between homocystein and stroke, also to explained whether treating hyper-homocystenemia can reduced the stroke in future.

REFERENCES

18. Malinow MR, Nieto FJ, Szko M, Chambless LE, Bond G. Carotid artery intimal-medial wall thickening and plasma homocyst(e)ine in
