Assay of cimetidine tablet and comparison of Local and multinational brand using UV spectrophotometer

Safila Naveed*, Amber Nawab, Najaf Farooq

Faculty of Pharmacy, Jinnah University for women, Karachi, Pakistan

Email address
safila117@yahoo.com (S. Naveed), safila117@gmail.com (S. Naveed)

Abstract
Cimetidine is a H\textsubscript{2} receptor antagonist, inhibit acid secretion. Assay has been performed by using an effective, simple and rapid spectrophotometric method. Two different brands of local and multi pharma tablets of cimetidine have been taken from pharmacies of Karachi, Pakistan. We have done comparison of assay of cimetidine. Absorbance was noted at 216nm wavelength of cimetidine using water as solvent. The present method can be employed for the QC analysis of cimetidine in tablet formulation. Our result has shown that the % assay of both brands of local and multi pharma have almost same and same in efficacy.

1. Introduction

The H\textsubscript{2} receptor antagonists inhibit acid production by reversibly competing with histamine for binding to H2 receptors on the basolateral membrane of parietal cells. Cimetidine is less potent than proton pump inhibitors but still suppress 24-hour gastric acid secretion by ~70%. The H2 receptor antagonists predominantly inhibit basal acid secretion, which necessary for their efficacy in reducing night time acidity. Because the most vital determinant of duodenal ulcer healing is the level of nocturnal acidity.

According to the current Biopharmaceutics Classification System (BCS), cimetidine would be assigned to Class III. INN name: Cimetidine, Chemical name:N”-cyano-N-methyl-N’-[2\{[(5-methyl-1H-imidazol-4-yl)methyl]thio)ethyl] guanidine[1].

In general use, the total daily dose by any route of administration should not exceed 2.4 g, whereas the standard dosage is 800 mg.

Adverse drug reactions to cimetidine are infrequent, occurring with an incidence of about 5%. These effects are usually reversible following a reduction of dosage or withdrawal of therapy. Accordingly, it can be concluded that cimetidine has a wide therapeutic index. (2) Cimetidine is slightly soluble in water (3). Cimetidine is a prototype drug and is readily absorbed from gastrointestinal tract, food can delay absorption. It is given three or four times aday. Cimetidine inhibits hepatic CP450 system and can interfere with the drug metabolized by this system. Thus concurrent administration of cimetidine will prolong the half life of a no. of drugs including theophylline, Phenobarbital, quinidine and benzodiazepines cimetidine also decreases hepatic blood flow which may decreased the clearance of flow limited drugs such as lidocaine and propanalol. Cimetidine undergoes some hepatic metabolism but
2.1. Instrumentation

UV visible spectrophotometer (1601), Shimadzu double beam was used to analysis of spectra. The water is used as a solvent for active and formulations.

2.2. Wavelength Selection

About 100 ppm of cimetidine active solution was prepared in water. These solutions scanned in 200-400 nm UV regions. The highest wavelength (λmax) was observed at 216 nm and therefor this wavelength was used for analysis of samples.

2.3. Standard Solution of losartan

Accurately weighed 10 mg of cimetidine was transferred to a volumetric flask and add distilled water to produce 100 ml, the conc of solution is 100 ppm in 100 ml.

2.4. Sample Preparation of Different Brands

The two different brands ulcerax and tegamate purchased from different pharmacies in Karachi, Pakistan. All tablets of each brand have same batch number and were labeled to contain cimetidine 40 mg. All the two brands have 5 year shelf life.

The serial number as an identification of purchased brands are given in Table 1.Using 20 tablets of two different brand of cimetidne from the marketed sample were weighed and average mean were calculated. By calculating the average weighed powder of each brand equivalent to 10 mg of cimetidine was transferred in a volumetric flask containing small water then solution was sonicated for about 5 min and then make up volume upto 100 ml with water. Same procedure was repeat for all brands for preparation of solutions.

2.5. Procedure

After preparation of standard and sample solutions of different brands, strength of all solutions 100 ppm in 100 ml. By using 216 nm wavelength absorbance noted and calculate % assay of each drug.

3. Result and Discussion

Cimetidine assay was conducted by spectrophotometer of two brands cimetidine available in Karachi. One belongs to local pharma and another belongs to multinational pharma. ULCERAX (40mg) shows absorbance 0.159 and another belongs TEGAMET (40mg) shows absorbence 0.159 at 216nm and %assay of these brands were also calculated which found to be 100.63 and 100.6 respectively (in table.1). Both the local and multi pharma shows almost same absorbance and %assay.

Result also analyzed by using SPSS software and T-test was used for analysis. We also plotted graphs between absorbance and concentration of multi pharma (fig 4) and of local pharma(fig 3). Both graphs shows linear absorbance, as the concentration increases the absorbances were also increased and show linear relationship between concentration and absorbance.
Accuracy

The accuracy of any analytical procedure indicate the measurement of closeness between sample and standard. It was calculated as percentage relative error between the measured mean concentrations and taken concentrations of both drugs. The results show in Table 4 with 0.000 with df 19 the significant results mean both drugs have no difference in assay.

4. Conclusion

The UV spectrophotometric process proposed for the determination of cimetidine in tablets dosage, technique employed effectively for analysis, it is particular, fast, basic, presice and rough. Proposed technique is quick and efficient as contrasted with different techniques, that why be efficient, effective and helpfully received process for routine QC testing or investigation in research centers. Our study revealed that both brands of local and multi pharma having same absorbance and % assay which means both are of same in efficacy and have not variation in their therapeutic actions.

![Figure 1. Structure of cimitidine](image)

![Figure 2. % assay of different brands](image)

### Table 1. Absorbance of different brands

<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Average wt of tablet g</th>
<th>Absorbance at 216 nm</th>
<th>% assay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulcerax</td>
<td>0.61</td>
<td>0.159</td>
<td>100.63</td>
</tr>
<tr>
<td>Tegamet</td>
<td>0.62</td>
<td>0.159</td>
<td>100.63</td>
</tr>
</tbody>
</table>

### Table 2. Regression equations of different brands

<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Regression equations</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>$y = 0.0016x - 0.0039$</td>
<td>0.9987</td>
</tr>
<tr>
<td>Multi</td>
<td>$y = 0.0016x - 0.0002$</td>
<td>0.999</td>
</tr>
</tbody>
</table>

### Table 3. Paired Samples Statistics

<table>
<thead>
<tr>
<th>Paired Samples Statistics</th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 brands &amp; Assay</td>
<td>1.5000</td>
<td>20</td>
<td>.51299</td>
<td>.11471</td>
</tr>
<tr>
<td>Assay</td>
<td>100.6070</td>
<td>20</td>
<td>.03278</td>
<td>.00733</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td>-99.35</td>
<td>-98.85</td>
<td>-837.574</td>
</tr>
<tr>
<td>Upper</td>
<td>-99.107</td>
<td>.5291</td>
<td>.11833</td>
</tr>
</tbody>
</table>

### Table 5. Paired Samples Correlations

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 brands &amp; Assay</td>
<td>20</td>
<td>-.469</td>
<td>.037</td>
</tr>
</tbody>
</table>

References


