Variable Rate Intravenous Insulin Infusion (VRIII)

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INTRODUCTION

In the U.K, 5% of the population have diabetes. Of these patients 30% are treated at some point using insulin medication. Insulin has been identified as a ‘top 10 high risk medication’ worldwide, with a narrow therapeutic range, requiring precise dosage adjustments with careful administration and monitoring (1,2).

The first national audit of over 14,000 diabetics in UK showed prescribing errors in 20% of cases (3). These are twice as likely to cause harm as errors compared to other prescribed drugs (4).

Intravenous (i.v) insulin prescription has traditionally varied widely between different clinicians and Hospitals (5,6). We audited the usage of i.v insulin at St Georges Hospital and found a variety of parameters, fluids, and types of i.v insulin being prescribed, leading to errors in its prescribing and administration. (Fig 1)

RESULTS

We standardised our iv prescription by introducing a Variable Rate Intravenous Insulin Infusion (VRIII) protocol. We introduced this protocol throughout St Georges Hospital. We audited its usage initially and monitored the accuracy of application. We then educated clinical staff regarding its administration and re-audited 6 months later.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Appropriate fluids</th>
<th>K checked</th>
<th>Na checked</th>
<th>Hypokalaemia</th>
<th>Hypoglycemia</th>
<th>Standardised Scale</th>
<th>Dedicated venflon</th>
<th>Appropriate iv insulin use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit 1 2009 Pre VRIII</td>
<td>4%</td>
<td>55%</td>
<td>50%</td>
<td>23%</td>
<td>29%</td>
<td>0%</td>
<td>0%</td>
<td>45%</td>
</tr>
<tr>
<td>Audit 2 Sep 2011 VRIII</td>
<td>69%</td>
<td>87%</td>
<td>87%</td>
<td>2.5%</td>
<td>2.6%</td>
<td>69%</td>
<td>54%</td>
<td>88%</td>
</tr>
<tr>
<td>Audit 3 Mar 2012 VRIII</td>
<td>99%</td>
<td>100%</td>
<td>100%</td>
<td>0%</td>
<td>2%</td>
<td>99%</td>
<td>100%</td>
<td>98%</td>
</tr>
</tbody>
</table>

CONCLUSION

The VRIII is now used successfully throughout the trust and is widely available through the hospital intranet. Initial concerns have been addressed through education of clinical staff. The protocol has shown decreased prescribing and administrative errors, whilst demonstrating good glucose and electrolyte control. In the future it is imperative we continue to educate clinical staff regarding its appropriate usage. In 6 months time we will reaudit to ensure the new protocol is still used correctly and throughout the trust by all clinical members of the team.

REFERENCES


DISCUSSION

Our initial audit raised concerns with the prescription & administration of iv insulin. We discovered >5 different regimes used which varied in fluid prescription, usage of K, hypoglycaemia classification & timing of conversion to s.c insulin. Our latest audit showed 99% of doctors prescribed iv insulin appropriately and no patient safety errors documented (fig 3). The one case of the VRIII not being used involved a locum Doctor. The same fluid was prescribed in 97% of cases and in all cases K was checked at least once. The VRIII was never prescribed inappropriately & it was always attached to the drug chart and used with a dedicated venflon. Our results showed no episodes of hypokalaemia / hyperkalaemia whilst on the VRIII. The Na & glucose levels were monitored throughout & the iv insulin prescription adjusted as needed.