The introduction of biologic therapies in the treatment of Inflammatory Bowel Disease (IBD) has ushered in a new era of treatment. These drugs have the potential to alter the natural history of this progressive disease. Unfortunately, remission rates with these biologic medications are only approximately 40%, (1) and in those who do achieve remission, the rate of loss of response (LOR) is more than 10% per year. (2)

In response to remission rates a treat-to-target therapeutic approach is emerging as the new standard of care for IBD (3). Achieving and maintaining appropriate drug levels in patients can facilitate reaching this goal, which can in turn then reduce the occurrence of flares and the possible need for surgery. Additionally it has been revealed that by initiating early aggressive medical therapy, routine monitoring, and appropriate therapeutic adjustment will help achieve mucosal healing and may improve outcomes for patients. (4)

Therapeutic drug monitoring (TDM) is seen as one of the cornerstones of personalised medicine which has been widely used to improve the treatment of various diseases. (5) The use of therapeutic drug monitoring (TDM) for infliximab and adalimumab- (anti-TNF-α trough levels and anti-TNF-α Antibody levels), are useful tools to monitor patients in the treatment of inflammatory bowel disease (IBD) and is becoming increasingly commonplace which leads to effective therapy optimization. (6)

Similarly in cases of non-response (primary or secondary) TDM can provide information about the cause of treatment failure and offer a rationale for steps to recapture response (7) the use of TDM has also proven to be a cost-effective strategy The TAXIT study assessed cost-effectiveness of TDM in IFX therapy alone. (8) And demonstrated that during the optimization phase, dose de-escalation indeed resulted in a 28% decrease in drug cost.

The Scottish TDM service launched in January 2018, located at the Clinical Biochemistry Department, Queen Elizabeth University Hospital, Glasgow. It offers IBD services across Scotland the opportunity to perform drug and anti-drug antibody levels for all infliximab and adalimumab formulations. The service has been commissioned by the National Services Division of NHS Scotland and is centrally funded. Importantly this means there is no direct cost for clinician or clinical service for TDM testing.

NHS Lanarkshire Gastroenterology IBD Departments inclusive of University Hospital Hairmyres, Monklands and Wishaw have decided to proceed with a Pro-Active Monitoring schedule for patients and utilise Re-active Monitoring schedule where required. This will encompass a person centred care model that can deliver an optimum healthcare with a cost effective strategy. IBD Nurses over the three sites will be responsible for incorporating the Pro-Active monitoring Strategy into individual patients’ care plans and presentation at Multi-Disciplinary Meetings(MDT).The Re-active schedule will also be managed by IBD Nurses and Consultants where need is identified in patients.
Pro-Active- performed in patients who have achieved a satisfactory clinical response with the aim of optimising therapy to prevent future flares and loss of response.

Re-Active- performed when treatment failure is developing e.g. in secondary loss of response, drug intolerance or infusion reaction. Can be undertaken during induction if primary non response (PNR) is suspected.

When to perform test:-

<table>
<thead>
<tr>
<th>Drug</th>
<th>When to Test</th>
<th>Assess patients symptoms</th>
<th>Update FCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infliximab</td>
<td>Immediately prior to infusion</td>
<td>Prior to sample</td>
<td>Prior to sample if required</td>
</tr>
<tr>
<td>Adalimumab</td>
<td>As close to next dose as possible</td>
<td>Prior to sample</td>
<td>Prior to sample if required</td>
</tr>
</tbody>
</table>


Pro-Active Treat to Target Approach – Moderate to Severe Disease Activity

**Infliximab** – Patient with Moderate to Severe Disease Activity, progressed from immunomodulators

- Initial baseline sample to be obtained prior to # 4 Infliximab
- Maintenance Results within therapeutic parameters
- Obtain sample after 3 escalated doses, discuss results at MDT, then follow Maintenance or Dose adjustment Path as required

**Adalimumab** – Patient with Moderate to Severe Disease Activity, progressed from immunomodulators

- Initial baseline sample to be obtained prior to week 12 injection
- Maintenance Results within therapeutic parameters
- Obtain sample after 3 months on escalated dose, discuss results at MDT, then follow Maintenance or Dose adjustment Path as required

**Dose Adjustment** Results determine a Dose Escalation to every 10 or 12 weeks

**Dose Adjustment** Results determine a Dose De-escalation to every 3 to 4 weekly
Re-Active Treat to Target Approach – Primary Non-response/Secondary Loss of Response/Flare

**Primary Non-Response/Secondary Loss of response/Flare Disease Activity in patients**

- **Infliximab**
  - **Primary Non-responder** – Obtain sample within 3 months of treatment due to patient remaining symptomatic of disease
  - Review results/patient/FCP
  - Results should assist with decision regarding treatment choice/switch drug/surgery etc. Once stable on treatment start pro-active monitoring

- **Adalimumab**
  - **Primary Non-responder** – Obtain sample within 3 months of treatment due to patient remaining symptomatic of disease
  - Review results/patient/FCP
  - Results should assist with decision regarding treatment choice/switch drug/surgery etc. Once stable on treatment start pro-active monitoring

- **Secondary Loss of response/Flare** – Obtain sample from patient when flare identified
  - Review results/patient/FCP
  - Results should assist with decision regarding re-capturing response/treatment choice etc. Once stable on treatment start pro-active monitoring

Results should assist with decision regarding treatment choice/switch drug/surgery etc. Once stable on treatment start pro-active monitoring.
References


6. Miranda D, Sgambato E, Ferrante D et al. Usefulness of monitoring the clinical course of Inflammatory Bowel Disease through determination of Infliximab or Adalimumab Trough levels and by the evaluation of antibodies. Digestive and Liver Disease 2018 50(2).
