

## USE OF GALLIUM-CITRATE 67 SCINTIGRAPHY TO MEASURE COLONIC TRANSIT TIME IN SPINAL CORD INJURED PATIENTS WITH NEUROGENIC BOWEL.

### Hypothesis / aims of study

To determine the colonic transit time (CTT) in spinal cord injured (SCI) patients having neurogenic bowel compared with uninjured individuals using oral Gallium-citrate 67 scintigraphy.

### Study design, materials and methods

This was a cohort study comparing CTT of SCI patients having neurogenic bowel with uninjured individuals having normal bowel function (control group). CTT was measured using oral <sup>67</sup>Gallium-Citrate scintigraphy at 24, 48 and 72 hours. The segmental and overall mean half-clearance time ( $t_{1/2}$ ) of <sup>67</sup>Gallium-Citrate were calculated and classified into three diagnostic subtypes *normal CTT*, *generalised outlet obstructed CTT* and *generalised slow CTT* if  $t_{1/2}$  was more than 50 hours.

### Results

A total of 30 SCI patients (eight with complete lesions, 22 with incomplete lesions) and 20 uninjured individuals completed the CTT scintigraphy. All SCI patients with complete lesions had significant *outlet obstruction CTT* in the entire colon (O.R 144, 95% C.I.1.8, 21.9) compared with seven (31.8%) SCI patients with incomplete lesions (O.R 5.6, 95% C.I 0.5, 63.3). Nine (40.9%) incomplete SCI patients had *normal CTT* compared with 18 (90%) controls. Six (27.3%) incomplete SCI patients had *generalised slow CTT* compared with two (10%) controls. The longest CTT in the SCI group was 28 days, while it was 3.2 days in the control group. The most prolonged CTT was noted in the distal colon. There was no significant difference in the segmental CTT of SCI patients compared with the control group ( $p>0.05$ ). The level of injury had a significant influence on the CTT in SCI patients. Paraplegic patients were three times more likely to have delayed CTT than tetraplegic patients (O.R. 11.0, 95% C.I 1.9, 63.8 compared with O.R. 4, 95% C.I 0.9, 16.3). Patients with traumatic cause of SCI were twice more likely to have delayed CTT in the entire colon compared with those of non-traumatic cause (O.R 11.8, 95% C.I 2.0, 68.0 compared with O.R. 5.4, 95% C.I 1.2, 23.2). Defaecation and the type of anal sphincter had no influence on the segmental and overall CTT. Prior use of oral or rectal laxatives had no influence on the segmental and overall CTT once it was discontinued.

### Interpretation of results

Paraplegia, traumatic cause of SCI and complete SCI lesions were independent risk factors for delayed CTT in SCI patients with neurogenic bowel. Age, gender, duration since SCI, ethnicity, type of anal sphincter, aetiology of SCI, prior use of laxatives and defaecation did not have any influence on the segmental and overall CTT in SCI patients. CTT delay was observed in the entire colon especially in the distal colon, suggesting complete transection of the parasympathetic nerves was more likely to result in colonic dysmotility and/or anorectal dysfunction. However, the lack of association between defaecation and the type of anal sphincter with the segmental CTT suggest colonic dysmotility of the entire colon to be the reason for CTT delay in SCI patients with neurogenic bowel.

### Concluding message

SCI patients with neurogenic bowel have CTT delay involving the entire colon, but more marked in the distal colon. Complete SCI, paraplegia and traumatic cause of SCI are independent risk factors for prolonged CTT. Oral gallium-citrate 67 scintigraphy provides a qualitative measurement of CTT in SCI patients with neurogenic bowel.

### References

1. *Am J Gastroenterol* 1995;90:1295-1300
2. *Spinal Cord* 2000;38:615-621
3. *Spinal Cord* 2001;39, 193-203

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| <b><i>Is this a clinical trial?</i></b>                        | <b>No</b>  |
| <b><i>What were the subjects in the study?</i></b>             | <b>HUMAN</b>   |
| <b><i>Was this study approved by an ethics committee?</i></b>  | <b>Yes</b>   |
| <b><i>Specify Name of Ethics Committee</i></b>                 | <b>University Malaya Medical Centre Ethics Committee</b> |
| <b><i>Was the Declaration of Helsinki followed?</i></b>        | <b>Yes</b>   |
| <b><i>Was informed consent obtained from the patients?</i></b> | <b>Yes</b>   |