Robotic Assisted Laparoscopic Colectomy

S Pandalai, DO Kavanagh, P Neary
Department of Colorectal Surgery, AMNCH, Tallaght, Dublin 24

Abstract

Robotic surgery has evolved over the last decade to compensate for limitations in human dexterity. It avoids the need for a trained assistant while decreasing error rates such as perforations. The nature of the robotic assistance varies from voice activated camera control to more elaborate telerobotic systems such as the Zeus and the Da Vinci where the surgeon controls the robotic arms using a console. Herein, we report the first series of robotic assisted colectomies in Ireland using a voice activated camera control system.

Introduction

Laparoscopic surgery is rapidly establishing itself as the standard approach to a variety of gastrointestinal conditions. Recognised benefits include shorter length of stay, reduced post operative pain, earlier restoration of bowel function and improved cosmesis compared to open surgery. However, it involves a significant learning curve. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback. Major technical disadvantages include: loss of dexterity involved in operating long instruments, exaggerated physiological tremor, fewer degrees of freedom of movement, two dimensional images and reduced tactile feedback.

The endocontrol system used in the current study consists of a motorized scope holder placed directly on the patient’s abdomen (Figure 1). It is sufficiently small to be placed directly on the operating room table without interfering with other instruments being used. It provides a stable platform thereby eliminating some of the natural physiological tremor associated with hand held manipulation. It allows 3 degrees of freedom and axial translation for zooming. This could eliminate the need for a trained assistant or conversely allow the trainer to manipulate the camera while the resident performs the case. The system is voice-controlled or activated by an accessory foot pedal.

Figure 1: Illustration of the robotic device grasping the laparoscope

Case 1

A 69 year old lady presented with intermittent right sided abdominal pain, vomiting and diarrhoea. Colonoscopy revealed a caecal tumour. A staging CT revealed no evidence of metastatic spread. She underwent a robotic assisted right hemicolectomy. Operative time was 2 hours. He made a favourable recovery and was discharged home on the sixth postoperative day.

Case 2

A 70 year old man was referred with symptomatic anaemia. His haemoglobin was 5.8g/dl. A CT scan demonstrated multiple hepatic lesions suggestive of metastatic disease. Endoscopy confirmed a right sided tumour which was biopsy proven. Following multidisciplinary discussion he underwent a robotic assisted right hemicolectomy to control bleeding from the primary. Operative time was 2 hours. He made a favourable recovery.

Case 3

A 69 year old lady presented with anaemia. Colonoscopy confirmed a caecal tumour. Histology confirmed adenocarcinoma. He had no metastases on abdominal imaging. He underwent a robotic assisted right hemicolectomy. Operative time was 2 hours. He made a favourable recovery and was discharged home on the sixth postoperative day.

Discussion

The last decade many developments have occurred in the field of robotic surgery. The advantage of the Endocontrol robotic platform described in the current series is that it provides a stable platform for the camera thereby eliminating the physiological tremor involved with human camera manipulation. It is likely that a single operator could perform complex laparoscopic procedures without the need for an assistant to guide the laparoscope. In our series there were no intra or postoperative complications associated with the usage of the device. Further studies are necessary to evaluate the Endocontrol system in terms of adaptability and possible ergonomic benefit in other colorectal procedures.

References


Correspondence: D Kavanagh
Department of Colorectal Surgery, AMNCH, Tallaght, Dublin 24
Email: dara.kav@hotmail.com

Robotic Assisted Laparoscopic Colectomy

4. Delaney CP, Neary PC, Heriot AG, Senagore AJ, Operative Techniques in Laparoscopic Colorectal Surgery (Lippincott Williams & Wilkins; (August 1, 2006)


