

P-OGC57 Predicting survival and response to therapy using diagnostic biopsies: A machine learning approach to facilitate treatment decisions for oesophageal adenocarcinoma

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Background: Standard of care for locally advanced oesophageal adenocarcinoma is neoadjuvant chemotherapy or chemoradiotherapy followed by surgery. Only a minority of patients (<25%) derive significant survival benefit from neoadjuvant treatment and there are no reliable means of establishing prior to treatment in whom this benefit will occur. Moreover, accurate prediction of survival prior to treatment is also not possible. The availability of machine learning techniques provides the potential to use complex data sources to answer these problems. In this study, we assessed the utility of high-resolution digital microscopy of pre-treatment biopsies in predicting both response to neoadjuvant therapy and overall survival.

Methods: A total of 157 cases were included in the study. Pre-treatment clinical information, including neoadjuvant treatment, was obtained, along with diagnostic biopsies. Diagnostic biopsies were converted into high-resolution whole slide-images and features extracted using the pre-trained convolutional neural network Xception. Single representative images were converted into patches from which predictive models were trained. Elastic net regression classifiers were derived and validated with bootstrapping and 1000 resampled datasets. The response to treatment was considered according to Mandard tumour regression grade (TRG). Model performance was quantified using the C-index (for TRG) and time-dependent AUC (tAUC, for Overall survival) along with calibration plots.

Results: Median survival was 78.9months (95%CI 35.9 months – not reached). Survival at 5-years was 52.1%. Neoadjuvant treatment was received by 123 patients (78.3%), with a significant response seen in 45 cases (36.6%). A response was more likely in those patients who received chemoradiotherapy than chemotherapy (53.3% vs 23.1% $p < 0.001$) and in older patients (median age 69.4 vs 66.0 years, $p = 0.038$), with other characteristics similar. A predictive model for response to neoadjuvant treatment derived from image features and clinical data achieved good discrimination (C-index 0.767, 95%CI 0.701-0.833) and calibration. Accuracy of prediction of overall survival was more modest (tAUC 0.640, 95%CI 0.518-0.762).

Conclusions: Using a small dataset, utility of a feature extraction pipeline in prediction of patient level outcomes has been demonstrated. This was more marked in prediction of response to neoadjuvant treatment than overall survival, which may reflect the importance of pre-treatment clinical data in determining the former outcome. Further study to refine the methodology and confirmation in larger datasets are required before expansion to clinical settings.



European Colorectal Congress

28 November – 1 December 2022, St.Gallen, Switzerland

Monday, 28 November 2022

09.50

Opening and welcome

Jochen Lange, St.Gallen, CH

10.00

It is leaking! Approaches to salvaging an anastomosis

Willem Bemelman, Amsterdam, NL

10.30

Predictive and diagnostic markers of anastomotic leak

Andre D'Hoore, Leuven, BE

11.00

SATELLITE SYMPOSIUM

ETHICON
PART OF THE Johnson & Johnson FAMILY OF COMPANIES

11.45

Of microbes and men – the unspoken story of anastomotic leakage

James Kinross, London, UK

12.15

LUNCH

13.45

Operative techniques to reduce anastomotic recurrence in Crohn's disease

Laura Hancock, Manchester, UK

14.15

Innovative approaches in the treatment of complex Crohn Diseases perianal fistula

Christianne Buskens, Amsterdam, NL

14.45

To divert or not to divert in Crohn surgery – technical aspects and patient factors

Pär Myrelid, Linköping, SE

15.15

COFFEE BREAK

15.45

Appendiceal neoplasia – when to opt for a minimal approach, when and how to go for a maximal treatment

Tom Cecil, Basingstoke, Hampshire, UK

16.15

SATELLITE SYMPOSIUM

Medtronic
Further.Together

17.00

Outcomes of modern induction therapies and Wait and Watch strategies, Hope or Hype

Antonino Spinelli, Milano, IT

17.30

EAES Presidential Lecture - Use of ICG in colorectal surgery: beyond bowel perfusion

Salvador Morales-Conde, Sevilla, ES



18.00

Get-Together with your colleagues

Industrial Exhibition

Tuesday, 29 November 2022

9.00

CONSULTANT'S CORNER

Michel Adamina, Winterthur, CH

10.30

COFFEE BREAK

11.00

SATELLITE SYMPOSIUM

INTUITIVE

11.45

Trends in colorectal oncology and clinical insights for the near future

Rob Glynn-Jones, London, UK

12.15

LUNCH

13.45

VIDEO SESSION

14.15

SATELLITE SYMPOSIUM



15.00

COFFEE BREAK

15.30

The unsolved issue of TME: open, robotic, transanal, or laparoscopic – shining light on evidence and practice

Des Winter, Dublin, IE

Jim Khan, London, UK

Brendan Moran, Basingstoke, UK

16.30

SATELLITE SYMPOSIUM



17.15

Lars Pahlman lecture

Søren Laurberg, Aarhus, DK

Thursday, 1 December 2022
Masterclass in Colorectal Surgery
Proctology Day

Wednesday, 30 November 2022

9.00

Advanced risk stratification in colorectal cancer – choosing wisely surgery and adjuvant therapy

Philip Quirke, Leeds, UK

09.30

Predictors for Postoperative Complications and Mortality

Ronan O'Connell, Dublin, IE

10.00

Segmental colectomy versus extended colectomy for complex cancer

Quentin Denost, Bordeaux, FR

10.30

COFFEE BREAK

11.00

Incidental cancer in polyp - completion surgery or endoscopy treatment alone?

Laura Beyer-Berjot, Marseille, FR

11.30

SATELLITE SYMPOSIUM

12.00

Less is more – pushing the boundaries of full-thickness rectal resection

Xavier Serra-Aracil, Barcelona, ES

12.30

LUNCH

14.00

Management of intestinal neuroendocrine neoplasia

Frédéric Ris, Geneva, CH

14.30

Poster Presentation & Best Poster Award

Michel Adamina, Winterthur, CH

15.00

SATELLITE SYMPOSIUM

OLYMPUS

15.45

COFFEE BREAK

16.15

Reoperative pelvic floor surgery – dealing with perineal hernia, reoperations, and complex reconstructions

Guillaume Meurette, Nantes, FR

16.45

Salvage strategies for rectal neoplasia

Roel Hompes, Amsterdam, NL

17.15

Beyond TME – technique and results of pelvic exenteration and sacrectomy

Paris Tekkis, London, UK

19.30

FESTIVE EVENING

Information & Registration www.colorectalsurgery.eu