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A Markov cohort decision analysis model was constructed using TreeAge Pro 2017 (TreeAge Software Inc., Williamstown, MA). The base case, surgery first by adjuvant therapy, was compared to neoadjuvant therapy followed by re-staging and, if appropriate, by surgical resection. Transition nodes were based on outcomes of response to neoadjuvant therapy on repeat CT scan (for the neoadjuvant cohort only), operative intervention and outcome, post-operative complications, and receipt of adjuvant therapy postoperatively. Results were adjusted based on quality-of-life indices for surgery, chemotherapy and/or radiotherapy, and no treatment was taken from published literature (table 1). Each cycle length was one month with a total number of 60 cycles. Patients cycled through the model until death or with a total follow-up time of 60 months for those still alive at model completion. For the Markov cohort analysis survival time was calculated from median survival time of each cohort based on: intervention, post-operative complication and neoadjuvant/adjuvant therapy. Markov survival states included: disease free survival, alive with disease and dead.

CONCLUSIONS

In conclusion the Markov decision analysis showed superior overall survival time, and quality adjusted survival time, with NAT pathway when all treatment modalities (i.e. surgery and chemotherapy) were considered. This finding in the context of an absence of conclusive superiority of one pathway over another on an intention-to-treat basis highlights two important directions for future research based on Markov decision-analysis:

1) cost-effectiveness analysis of neoadjuvant versus upfront surgery
2) exploring methods of predictive statistical modeling to identify patients who are more likely to receive and benefit from differing treatment modalities.

By moving research in this direction it is hoped that we can find a path from ambiguity to precision medicine with associated benefit to patients and resource utilisation.

ABSTRACT

The aim of this study is to create a Markov decision analysis model based on a single institution database to compare SF versus NAT pathways for treatment of RPC. Approaches were assessed on an intention-to-treat basis and Markov analysis undertaken. Probabilities of interventions, clinical outcomes, and survival in both SF and NAT cohorts were calculated from the West of Scotland Pancreatic Unit prospective database which recorded data for a cohort of 211 consecutive patients with RPC and 82 patients undergoing surgery at the West of Scotland with resectable pancreatic cancer. SF pathway was exclusively performed from January 2008 to July 2012. From 1 August 2012 working backwards, 100 sequential patients in SF pathway who had resectable pancreatic cancer and were deemed fit for surgery based on performance status score and CPEP (7) were selected (n=100). Borderline and locally advanced problems were determined according to AHPBA/SGSS/SOES guidelines. From August 2012 working backwards, 100 sequential patients in SF pathway who had resectable pancreatic cancer and were deemed fit for surgery based on performance status score and CPEP were selected (n=100) and followed by re-staging and, if appropriate, by surgical resection. Neoadjuvant regime was FOLFIRINOX unless patient had poor performance status, were aged over 70 years, or FOLFIRINOX was poorly tolerated, when GEMCAB/CECAP (GEMCAP) was given instead. Ethical approval for data collection was granted by the West of Scotland Local Research Ethics Committee.

METHODS

CONCLUSIONS

This analysis was performed to simulate an optimal treatment pathway based on the West of Scotland Pancreatic Unit prospective database and an intention-to-treat basis highlights two important directions for future research based on Markov decision analysis:

1) Cost-effectiveness analysis of neoadjuvant versus upfront surgery
2) Exploring methods of predictive statistical modeling to identify patients who are more likely to receive and benefit from differing treatment modalities.

By moving research in this direction it is hoped that we can find a path from ambiguity to precision medicine with associated benefit to patients and resource utilisation.

REFERENCES


