

Geriatric Surgery Service – Our Journey Piloting in Colorectal Surgery and Future Challenges

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The Geriatric Surgery Service of Khoo Teck Puat Hospital (KTPH) today was born in 2007. The idea arose from a journal article that was written in 2006 where the need for a better way of managing elderly patients through surgery was identified.¹ There was a realisation that elderly surgical patients could not be managed in a similar fashion as younger patients. In elderly patients, comorbidities, functional capacity and frailty interplay with each other. The treatment goals in the elderly may also differ and they need to be more individualised.

The Geriatric Surgery Service was started to deliver the complex and multifaceted care that elderly (>75 years of age) surgical cases demanded. The processes involved in the service were piloted in major colorectal resections performed in our institution. At the start state, the 30-day mortality rate was nearly 10% and major morbidity rate was about 30%. The team started with a surgeon and a nurse coming together to anchor the service and was subsequently expanded to include an anaesthetist, a geriatrician, cardiologist, physiotherapy, dietitian and medical social worker. A pharmacist was also added to the team. The first few cases were managed by a team in Alexandra Hospital before the move to KTPH.

The earlier period of the service involved studying the epidemiology and outcomes of this patient group.² An important development was the identification of the deficiencies of multidisciplinary care and the evolution to a transdisciplinary care process. The pitfalls of our multidisciplinary care were identified as such:

- a. Failure of the team members to have a common vision or goal.
- b. Failure to do the interventions in a timely and coordinated fashion.
- c. Poor communication – the only form of communication was often done through entries in case notes.
- d. Failure to understand what each in the multidisciplinary team was doing.

- e. Lack of ownership to take patients from start to finish as care was fragmented.

The articulation of transdisciplinary care was pivotal in the development of the Geriatric Surgery Service; the use of the word “transdisciplinary” was crucial in helping to understand that multidisciplinary care as we knew it may have been suboptimal in providing care good enough for the elderly. There was a need for a higher evolution of the care to facilitate a more coordinated and seamless process of the entire care team. The transdisciplinary model of care aimed to address the pitfalls that were identified through a flattening of the hierarchy, heightened communication, being more patient-centric and role enhancements of the members of the team. Patients and family also become an integral part of the team. This was with the realisation that patient and family buy-in was crucial to the whole process. Family members provided good support and care that could not be surpassed by any healthcare worker but they needed to be engaged.³

There was also a need to not just look at mortality and morbidity as postoperative outcomes but also at functional recovery in the longer term. It was found that many patients in the service were more fearful of disability and loss of independence than death. In 2010, a review of the literature on surgical outcomes of elderly patients who had undergone major surgery was conducted. Many papers had boasted good mortality rates after surgery; however, only few reported on postoperative functional outcomes. One needed to ask the question: what good would surgery do for an elderly individual who survived, yet becomes debilitated and loses independence?⁴ The direction then became very clear. There was a need to manage elderly patients with vigour and attention, and the prime motive must be for these patients to return to their original functional ability after major surgery.

The following goals were then set for patients who went through the service: not only should they survive, they should also not have a prolonged hospital stay for any reason, be

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Fig. 1. The ‘Start-to-Finish’ process of the Geriatric Surgery Service.

it for surgical or medical complications, or social issues. Patients were also expected to have functional recovery within 6 weeks after surgery. If any of these 3 criteria were not achieved, the management was considered a failure. The cumulative sum (CUSUM) curve methodology, a powerful tool that tracks clinical outcomes, was used to assess consecutive cases for success and failure. The difficulty of the cases was adjusted using physiological and operative parameters and measures consistency of obtaining successful outcomes. Through these methods, comparisons could be made between heterogenous groups of patients. It was then demonstrated that with these changes, consistently good outcomes for the elderly patients who passed through the service was achieved. This was in stark contrast to the consistency of patients that were managed in the conventional way.⁵

In 2009, the impact of the entity of frailty on elderly surgical patients was explored. There was an increasing understanding of the condition and how frailty should be considered separately from comorbidities. There was a collaborative study with a Japanese hospital that was subsequently published in the American Journal of Surgery in 2012. It was found that frail patients were 4 times more likely to experience major complications after surgery even after their medical conditions were adequately optimised in the conventional way.⁶ Frailty in the elderly represents the reduction of functional reserves in one’s body and thus carries a higher risk of precipitous deterioration after the

trauma of surgery. This group of patients needed even more preparation before surgery; more attention also needed to be paid to them during the perioperative period and the subsequent postoperative period, including after discharge.

It became clear that rehabilitation should not start after the trauma of surgery but before. Learning how to exercise only when they were experiencing pain with tubes attached to their bodies was suboptimal. A programme was developed through the input of enthusiastic and dedicated nursing, physiotherapy and nutrition support staff together with the surgeons. Areas of focus included education, physical conditioning and attention to nutrition. All these interventions would start weeks before surgery and were followed through after surgery. Post-surgery, there was attention paid to self-care, independence and social integration. Through funding from the Healthcare Quality Improvement Fund, a community-based programme termed ‘Start-to-Finish’ was developed. This programme spans the continuum from diagnosis all the way to functional recovery and social integration (Fig. 1).

The process starts at the time of diagnosis and does not end until the patient has attained a functional capacity similar to before the disease and has integrated back to society. Perioperative care is much more than “from operating theatre to recovery area”. Enhanced recovery was also incorporated into the programme in 2013.

The traditional model of care is shown in Figure 2, in

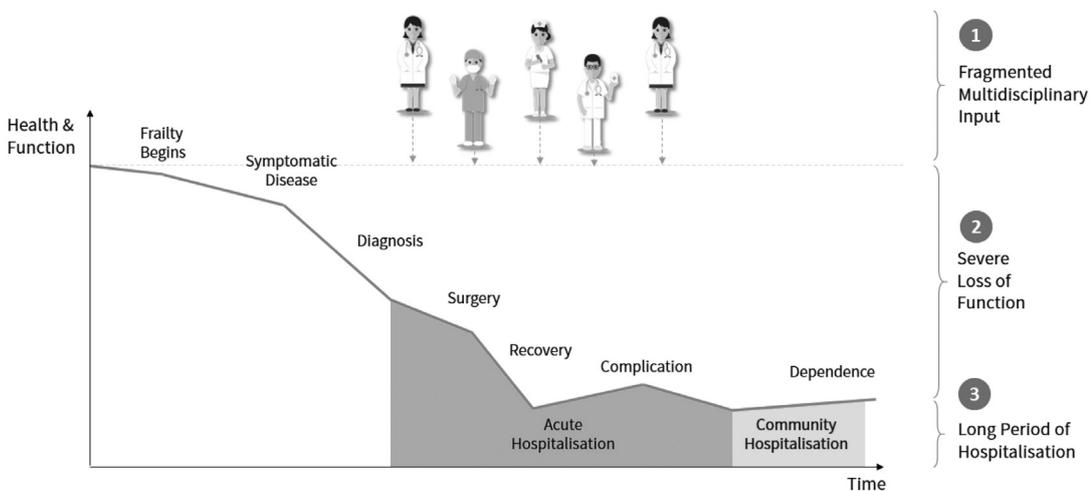


Fig 2. Traditional model of care for elderly surgical patients.

comparison with our current model of care shown in Figure 3.

The programme has now been kept sustainable through continued support from the hospital and involvement with transitional care. It was initially piloted with the major colorectal surgery department but has now been extended to departments of other forms of abdominal surgery. Only through this process from start to finish can the healthcare team ensure good outcomes and eventual good disability-free survival after surgery. The medium-term functional outcomes and subsequently, the long-term outcomes from the ‘Start-to-Finish’ programme, have been published.^{7,8}

Throughout this whole process, major complication rates were reduced from 30.8% to 5.3%. Mortality rate was reduced from 9.6% to 1.7%. Functional recovery is now 98% and for frail elderly patients, the mean length of stay has been reduced from 11.0 days to 8.4 days. This was achieved despite having increased the number of frail patients who were operated on.

Essential milestones of the Geriatric Surgery Service are as follows:

- January 2007: The basic Geriatric Surgery Team was formed. It consisted of a surgeon, nurse, geriatric physician, anaesthetist and cardiologist, and was started with no added resources.
- 2007 to 2009: Processes and protocols were developed for elderly patients of colorectal surgery. A study was done on the epidemiology and outcomes of this patient group.
- 2009 to 2011: Processes were consolidated and the transdisciplinary team was expanded to include more allied health practitioners. The transdisciplinary process was formally described. The results of our

study, which demonstrated a sustained pattern of consecutively successful outcomes measured mainly by functional recovery after major surgery through CUSUM methodology, was published.

- 2012: The entity of frailty and the development of new processes, including prehabilitation, were recognised. The transinstitutional ‘Start-to-Finish’ programme was borne after securing the Healthcare Quality Improvement Fund funding of S\$200,000. The textbook ‘Colorectal Cancer in the Elderly’ was published by Springer.⁹
- 2013: All subspecialties in our institution’s Department of General Surgery used similar processes. The study that found functional recovery to be more than 83% at 6 weeks after major surgery and more than 90% after 90 months was published.⁷ Enhanced recovery was incorporated into the programme.
- 2014: The philosophy of our work was published in a high impact journal, ‘Annals of Surgery’.
- The textbook ‘Transdisciplinary Perioperative Care in Colorectal Surgery’ was published by Springer.¹⁰
- 2016: The results of the ‘Transinstitutional Transdisciplinary Start to Finish Programme’ was published.⁸

Despite these encouraging developments, the challenges ahead remain real. The surgeons’ and other healthcare workers’ mindsets need to evolve and there needs to be more buy-in into these needs of the elderly surgical patient. There remains an uneven culture in most institutions where the silos of administrative barriers and historical departments hinder true team-based care. There is a need to constantly

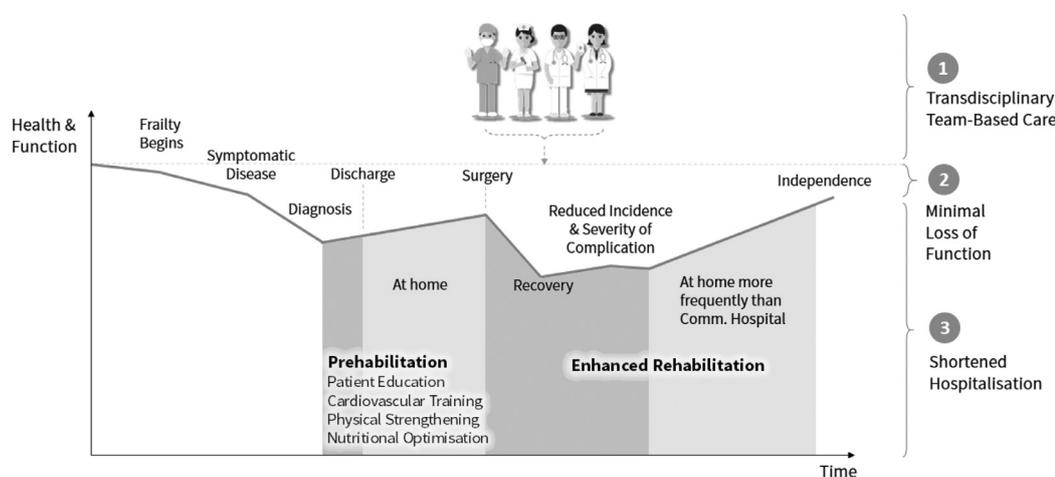


Fig. 3. Our Geriatric Surgery Service model of care.

look at the processes and collaborations critically and without reservation in order to ensure sustainability. The distinction of having value over quality needs to be a constant reminder. In doing so, there is a need to streamline and reduce redundant processes. There is also a greater need for collaborations between administrative departments and across institutions so that pockets of excellence can be amalgamated and integrated for the greater good of patients. Ultimately, there is still a long way to go.

Moving forward, we will be considering how to further improve our processes and extend prehabilitation to pre-frail patients. We will continue to share our work to other hospitals in and out of Singapore and we look forward to forming collaborations to develop more care for the elderly surgical patient in Singapore and the region. More recently, the National Health Service in the United Kingdom has been articulating new models of perioperative care with a similar mindset. Over in Australia and New Zealand, the awareness of the need for more specialised care for elderly surgical patients has also increased. We have truly come to an era where geriatric surgery has taken centre stage.

REFERENCES

1. Tan KY, Chen CM, Ng C, Tan SM, Tay KH. Which octogenarians do poorly after major open abdominal surgery in our Asian population? *World J Surg* 2006;30:547-52.
2. Tan KY, Kawamura Y, Mizokami K, Sasaki J, Tsujinaka S, Maeda T. Colorectal surgery in octogenarian patients – Outcomes and predictors of morbidity. *Int J Colorectal Dis* 2009;24:185-9.
3. Tan KY, Konishi F, Tan L, Chin WK, Ong HY, Tan P. Optimizing the management of elderly colorectal surgery patients. *Surg Today* 2010;40:999-1010.
4. Chee J, Tan KY. Outcome studies on older patients undergoing surgery are missing the mark. *J Am Geriatr Soc* 2010;58:2238-40.
5. Tan KY, Tan P, Tan L. A collaborative transdisciplinary "geriatric surgery service" ensures consistent successful outcomes in elderly colorectal surgery patients. *World J Surg* 2011;35:1608-14.
6. Tan KY, Kawamura YJ, Tokomitsu A, Tang T. Assessment for frailty is useful for predicting morbidity in elderly patients undergoing colorectal cancer resection whose comorbidities are already optimized. *Am J Surg* 2012;204:139-43.
7. Wang Z, Tan KY, Tan P. Functional outcomes in elderly adults who have undergone major colorectal surgery. *J Am Geriatr Soc* 2013;61:2249-50.
8. Chia CL, Mantoo SK, Tan KY. 'Start to finish trans-institutional transdisciplinary care': a novel approach improves colorectal surgical results in frail elderly patients. *Colorectal Dis* 2016;18:O43-50.
9. Tan KY. *Colorectal cancer in the elderly*. New York City: Springer Heidelberg; 2013.
10. Tan KY. *Transdisciplinary Perioperative Care in Colorectal Surgery – An Integrative Approach*. New York City: Springer Heidelberg; 2013.