



Original Research

Time to rethink surgeon-specific outcome data for colorectal surgeons in England: Cross-sectional data of 73,842 resections for colorectal cancer



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ABSTRACT

Since 2013, individual surgeon and NHS Trusts outcomes following elective colorectal cancer surgery have been in the public domain in England. The 90-day operative mortality rates following colorectal resections are available for the public to view online.

Aim: The aim of this study is to evaluate the quality of the published data. It also aims to find whether this data will show the expected pattern of inverse correlation between case volume and the postoperative 90-day mortality rate.

Methodology: The postoperative 90-day mortality data was taken from the Association of Coloproctology of Great Britain and Ireland (ACPGBI) website. Surgeons and Trusts were categorized according to case volume. Completeness of data at Trust and surgeon levels was analysed. All statistical analyses were performed in Statistical Package for Social Science (SPSS, version 23, IBM, Armonk, NY).

Results: 788 colorectal surgeons performed 73,842 resections for colorectal cancer in 143 hospitals over a 5-year period (1st April 2010 and 31st March 2015). The mean national 90-day mortality after colorectal resections was 2.6%. No significant effect was identified when mortality rates were correlated with the surgeon or Trust volume. There was a missing data of 3874 patients in the individual surgeon level analysis when compared to the number of procedures included in Trust analysis (73,842 vs 69,968 cases). About one-third of hospitals ($n = 43$) had a case ascertainment of less than 90%. Out of the 788 surgeons, there were only two outliers whose mortality rates were outside the “funnel limit”.

Conclusion: The expected relationship between case volume and mortality rates could not be established. The completeness of data and low numbers of procedures per surgeon are major concerns. Additional outcome metrics should be utilized to assess performance quality. Failure to Rescue approach should be explored and utilized. It is crucial to have more rigorous and streamlined methods for data collection and case ascertainment to present to the public reliable, complete and relevant data.

1. Introduction

Following the Bristol inquiry, the death rates of hospitals and individual cardiac surgeons were made public to promote transparency [1]. In 2012, the NHS Commissioning Board's publication “Everybody Counts” demanded that outcomes should be available to the public across 9 surgical specialties [2]. It is believed that publishing surgeon specific outcome data (SSD) improves quality of care [3]. This was hailed as a “historic step forward in transparency” in surgical practice [4].

Since 2013, individual surgeon and NHS Trusts outcomes following elective colorectal cancer surgery have been in the public domain in England. The 90-day operative mortality rates are published online on the NHS choices website [5] as well as the website of the Association of Coloproctology of Great Britain and Ireland (ACPGBI) [6]. It is stated on the ACPGBI website that this information is part of the government initiative to create greater transparency and more choice for patients.

The aim of this study is to try to evaluate the quality of the published data and assess whether it makes the public better informed. It

also aims to find whether this data will show the expected pattern of inverse correlation between case volume and the postoperative 90-day mortality rate.

2. Methods

The postoperative 90-day mortality data was taken from the ACPGBI website (<http://www.acpgbi.org.uk/surgeon-outcomes/> (accessed Feb 2018)). Surgeons were categorized according to case volume (Low: 10–66, Medium: 67–105, High: 106–328 resections). Trusts were divided into 3 groups according to case volume: Low if < 400 , Medium if 400–589, High if 590 or more resections over the study period. Surgeon and Trust mortality rates were compared according to patient volume. Completeness of data at a Trust level was analysed. All statistical analyses were performed in Statistical Package for Social Science (SPSS, version 23, IBM, Armonk, NY). This work has been reported in line with the STROCSS criteria [7].

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Table 1
Mortality rate stratified by hospital and surgeon volume.

		OR [95% CI]		P value
Hospital volume	n	MR (%)		NS
Low Volume (153–399 procedures)	52	2.85	1	
Medium Volume (402–589 procedures)	52	2.65	1.084 [0.966–1.217]	
High Volume (597–1135 procedures)	43	2.63	1.011 [0.913–1.217]	
Surgeon volume	n	MR (%)		NS
Low Volume (10–66 procedures)	266	2.595	1	
Medium Volume (67–105 procedures)	262	2.610	0.99 [0.87–1.14]	
High Volume (106–328 procedures)	260	2.605	1.01 [0.904–1.1]	

3. Results

788 colorectal surgeons performed 73,842 resections for colorectal cancer in 143 hospitals over a 5-year period (1st April 2010 and 31st March 2015). The mean national 90-day mortality after colorectal resections was 2.6%. No significant effect was identified when mortality rates were correlated with the surgeon or Trust volume (Table 1). There was a missing data of 3874 patients in the individual surgeon level analysis when compared to the number of procedures included in Trust analysis (73,842 vs 69,968 cases). About one-third of hospitals (n = 43) had a case ascertainment of less than 90%. Out of the 788 surgeons, there were only two outliers whose mortality rates were outside the “funnel limit” (Fig. 1).

4. Discussion

This study failed to establish a significant correlation between 90-day operative mortality with surgeon or Trust volume. This is inconsistent with the data from several studies from both the UK and across the world which have demonstrated a significant survival benefit in high volume centres and high volume surgeons [8,9].

Completeness and accuracy of data is a major challenge when using large clinical databases [10]. This data had a case ascertainment of less than 90% in one third of the hospitals. This reflects the discrepancy between the number of patients submitted by Trusts and the numbers predicted by other national data sources. The potential missing data could also be seen in the mismatch between surgeons and Trusts data. One of the possible explanations of this is the lack of a streamlined

method in data collection as NHS Trusts collect data in different ways.

One of the main concerns in this data was the average number of procedures per surgeon. Walker and colleagues estimated that the surgeon should have performed more than 150 colorectal resections to have a statistical power of 80% to detect an outlier. This translates to an 8 out of 10 chance of detecting poor performance [11]. They based their calculation on the national overall 90-day mortality for 2010, which was 5%. Therefore, with the current mean national mortality rate of 2.6%, an even higher number of procedures is needed to detect a genuine outlier. This ACPGBI data show that only less than 10% of the colorectal surgeons have actually done more than 150 procedures over the 5-year period (71 out of the 788 surgeons). This doesn't compare favourably to cardiothoracic surgeons where 72% of them achieve the needed number to reach a power of 80% [11]. This data could therefore have the opposite effect of what is desired, as low numbers can potentially mask poor outcomes and lead to false complacency [11].

The single indicator of surgeon quality within this data was 90-day operative mortality. This approach of using postoperative mortality in colorectal cancer has been traditionally the “bottom line” of surgical care and the main outcome to be considered in assessing quality [12]. This is a potentially limited approach as it overlooks other important factors that can influence the outcome. It has been shown that the main risk of postoperative death is due to patients comorbidities and post-operative care rather than individual surgeon performance [13]. 90-day mortality should not be therefore be the only marker of surgical competence.

We believe more metrics of outcome measures should be utilized, instead of relying on a single quality indicator. Lymph node harvest, length of hospital stay, readmission rates, stoma rates, stoma reversal rates and patients quality of life and experience are all essential parameters in the management of colorectal cancer patients that can be used in detecting poor performance. In fact, many patients prefer a better quality of life as opposed to its length, so a quality of life measure would be more informative for this group of patients and a measure of treatment success [14].

Publishing SSD might drive improvement due to the so-called “Hawthorne effect” [15], but it can also be counterproductive and lead to a risk-averse behaviour. In a recent survey of colorectal consultants in England [16] (n = 293), 97% expressed concerns about the current method of reporting and one quarter said they had avoided operating on high-risk patients because of the published outcomes. This is expected to lead to more patients who will need emergency surgery -with its associated higher morbidity and mortality. So instead of improving the performance, SSD has potentially created a deleterious conflict of interest that affects patients inadvertently. Similar risk-averse behaviour was noticed in cardiothoracic surgery in the US [17]. The data also showed that cardiac surgery patients were denied an operation and were being disadvantaged because of that [18,19]. Because of this,

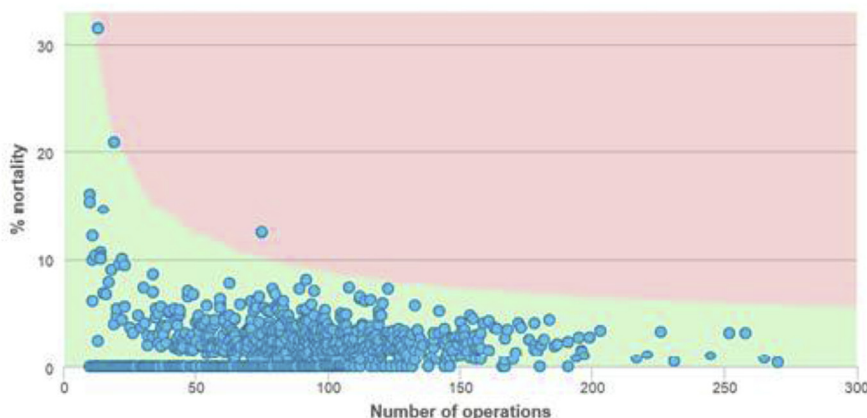


Fig. 1. 90-day mortality by surgeon (Source: <https://www.acpgbi.org.uk/surgeon-outcomes/>).

thoracic surgeons in the UK abandoned publication of mortality data. They argued that publication would decrease resection rates, which are already poor when compared to other European countries [20].

The main declared aim of publishing this data was to inform the public. However, with the caveats above, it is doubtful that the public is better informed having access to SSD. In fact, this data could potentially mislead the public, as there are only two outliers in the published data (0.25%). This very small percentage obviously is not consistent with what someone expects from a Bell curve of normal distribution. This could give a false sense of safety because this data say that 99.75% of the surgeons are supposedly safe. The lack of a proper statistical power in this data should be a serious concern for the public and the surgeons alike, because it can potentially lead to falsely label some surgeons as poor performers and at the same time give a false reassurance about actual poor performance.

Another important potential consequence of SSD is the undermining of the importance of the team. Westby et al. showed that the role of team and other factors, other than the surgeon, are far more important in risk modification of operative death [21]. This has been demonstrated in cardiothoracic surgery [22]. This is why some advocate the publication of units results only. When an individual surgeon bares the whole responsibility, this will distract attention away from important aspects in the current management of colorectal cancer that affect mortality, such as late presentation, systematic failings, underfunding, and lack of resources and infrastructure. In fact, this can potentially disguise institutional failings as was shown in cardiothoracic surgery [21]. It can also be potentially detrimental for local mechanisms for improvement, such as internal appraisal. So, instead of meaningful inquiries to explain why and how a patient dies, the whole responsibility will be allocated to one team member. This was also demonstrated by West et al. who showed a consistent relationship between resources management and hospital mortality rates [23].

The evidence has shown that the collective team approach has a higher impact on the outcome than that of the individual surgeon [22]. Improving the “team” will promote multidisciplinary collaboration, and would direct more attention to improving perioperative care and optimization of patients. It would also help to make colorectal units more accepting of operating on high risk surgical patients.

The debate should be opened to explore more complex methods to assess clinical outcome such as Failure to Rescue (FTR) approach, which is a widely used quality metric in US in surgery and trauma [24]. Early recognition of a deteriorating status of a patient by nursing staff must trigger escalation and management by medical staff. The lack of early detection leads too often to poor results and leads to FTR. In the UK, FTR was the main contributor to operative mortality in a cardiac surgery study [21]. This was significantly affected by factors such as temporary staff and team consistency [21]. These factors are beyond the control of individual surgeons. It is believed that patients in the US are far less likely to die from FTR events than their UK counterparts [25].

5. Conclusion

Unless the above points are addressed, it is our view the current data will not be meaningful to the public. Also, it will mislead rather than inform. For this, the colorectal surgeons and their representing body (ACPGBI) should call for abandoning the publication of individual mortality data in its current form. It is also vital to have more rigorous and streamlined methods for data collection and case ascertainment to present to the public reliable, complete and relevant data.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.ijssu.2018.08.005>.

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