

An audit on general surgical readmissions

ORIGINAL RESEARCH

AUTHOR

Jennifer Hobbiss

FY1 doctor

Royal Hampshire County Hospital

Ms Helen Doran

Consultant General and Endocrine

Surgeon

Salford Royal Foundation Trust

Address for Correspondence:

Jennifer Hobbiss,

Royal Hampshire County Hospital,

Romsey Road,

Winchester,

Hampshire,

SO22 5DG

Email: jenny.hobbiss@doctors.org.uk

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ABSTRACT

Introduction: The objective of this study was to investigate general surgical readmissions at Salford Royal Foundation Trust (SRFT) and to assess the patterns of readmission in pathology and patient group characteristics.

Methods: We performed a retrospective audit of patients re-admitted as an emergency within 30 days of being discharged by the general surgery team at SRFT over seven months from April 2018 to October 2018. Patient NHS numbers were provided by Hospital Episode Statistics via the Information Business Team at SRFT. Data was input into Microsoft Excel and statistical analysis was performed using StatsDirect 2018.

Results: During this period, 171 patients were coded as general surgery emergency readmissions. Subsequent exclusion left 91 patients in our readmissions group. We compared this with 3261 patients who had been admitted to the general surgical team over the same time period. Gallstone pathology made up 26.4% of the readmission patients, but only 9.26% of all general surgical patients. 58.5% of the surgery on the readmission group was non-elective, compared to 29.7% of all patients. In the readmission group, patients who had a previous operation cancelled had higher rates of early post-operative complications per operation (0.6 complications per operation) from their subsequent operation, than patients who had no previous cancellations (0.229). Four patients (4.4%) had no discharge summary; another seven (7.7%) did not get any patient advice. For 16.5% of patients, the written discharge advice to them, or lack of such advice, was involved in their readmission.

Conclusions: Gallstone pathology was over-represented in the readmissions group. Of the patients who had surgery on index admission, the readmission group had a higher proportion of non-elective surgery than all surgery patients. Written discharge advice was varied and inconsistent, and was not present for 12.1% of patients. Clearer discharge advice with more available written advice could reduce avoidable readmissions.

INTRODUCTION

Emergency readmissions into hospital are disruptive and costly for both the patients and hospitals and are associated with worse outcomes. An emergency readmission is any readmission that is unplanned and occurs up to 30 days after discharge from initial admission. (1)

On both sides of the Atlantic, emergency readmission rates have been used as a quality indicator and have been the basis for 'pay-for-performance' metrics, making them a target area for both clinicians and hospital management. (2, 3) In the UK, the National Tariff Payment System (NTPS) has 'incentivised' British hospitals by withholding funding for a patient's readmission since 2011. (1) The withheld money was to be spent on the key areas that may have been implicated in readmissions: 'better discharge planning, more collaborative working and better co-ordination of clinical intervention with community and social care providers'. (1)

It is therefore not surprising that there has been a huge amount of research into emergency readmissions. However, there are two main reasons for further analysis of surgical readmission rates. Firstly, despite financial incentives and large amounts of research, emergency readmission rates are on the rise in the UK. Figures from the Nuffield Trust show that between 2010/2011 and 2016/2017 the number of emergency readmissions increased by 19.2%. (4) Healthwatch England reported in November 2018 that rates are 'growing faster than before'. (5)

Secondly, the vast majority of the readmission research has focused on medical patients. As Wiseman et al. state in their systematic review of surgical readmissions, 'readmissions have received less attention in the surgical specialties', a fact which they describe as 'remarkable given the frequency of surgery'. (6)

Post-operative complications are often the leading cause for the readmission, with McSweeney et al. showing a significant correlation between the number of post-operative complications and an increasing readmissions rate. (7) In addition, they found that intra-abdominal operations were more likely to lead to post-operative complications than other general surgical procedures such as mastectomy, parathyroidectomy and thyroidectomy. (7) Dehydration was the cause of up to 20% of emergency readmissions after surgery in some studies, followed by post-operative infection. (8, 9)

The relationship between length of stay for the index admission and readmission rates is not clear at present. There are worrying trends though, as Manilich et al. report, with the length of stay in hospital going down for colectomies for colon cancer while readmission rates are going up. (8) There is an ongoing debate on whether open or laparoscopic surgery delivers better outcomes and higher readmission rates. (9) Finally, some of the literature highlights that surgical readmissions tend to be readmitted for a surgical problem, rather than a medical problem, which is perhaps explained by the 'medical optimisation' of surgical patients before elective surgery. (2)

There is an underlying question throughout much of the current literature on emergency readmissions: what proportion of readmissions are avoidable? The figures vary wildly from 75% to less than 20%. (8, 10) This lack of clarity raises the question as to whether 30 day emergency readmission rates are reliable quality indicators. As Jotny and Jha put convincingly, 'much of what drives hospital readmission rates are patient- and community-level factors that are well outside the hospital's control'. (10) They cite socio-economic status and co-morbidities, such as mental illness, as the key factors in readmission rates within the 30 day timeframe rather than hospital care. They argue that if readmission rates are to play their part as a quality indicator, then they must be limited to only seven, or even three days post-discharge. (10)

Hospital trusts look at local rates of readmission and, if necessary, local solutions to reduce them. At Salford Royal Foundation Trust (SRFT) an audit was undertaken in the general surgery department by Dr Matthew Davenport to explore the proportion of general surgical readmissions that reflected 'true emergency readmissions' according to the NTPS definition. (1, 11) This audit found that readmission rates of general surgical patients varied between 5-10% from April to October 2018. (12) Of these readmissions, there were only 5 patients who were incorrectly coded as general surgical emergency readmission errors, accounting for only 2.9% of the total patients classed as readmission. (12) As this was lower than expected and therefore unlikely to reveal much scope for improvement, focus turned to the 'true readmissions'. It was felt that a greater understanding of this group was needed and further investigation was required.

The aims of this study were to investigate general surgical readmissions within 30 days at Salford Royal Foundation Trust between April 2018 and October 2018. Our objectives were to further assess patterns of pathology in patient groups identified by the previous audit and to identify trends in patient characteristics in patients who have an emergency readmission to a general surgical ward.

MATERIALS AND METHODS

Study setting

Salford Royal Foundation Trust (SRFT) is a large hospital trust in the city of Salford in the Northwest of England. It is responsible for local health services to the people of Salford with a population of over one million people, whilst also providing many specialist services to Greater Manchester and its surrounding area. (13)

Study design

We performed a retrospective audit of patients admitted under the general surgery team at SRFT from April 2018 to October 2018 inclusive. We then further reported on the patients from this group who, following discharge by the general surgery team, were subsequently readmitted as an emergency within 30 days.

Participants

In the initial audit, 171 patients were received as emergency readmissions. Nine patients were then excluded after being decided they were ‘not true’ readmissions. This was due to either being incorrectly coded as general surgery (n=5), their second admission was a planned day case procedure (n=3) or due to a patient self-discharging and later reattending (n=1).

This left 162 ‘true’ admissions. These were subsequently divided into further subgroups depending on the reason for their readmission (Figure 1).

This left four subgroups to further investigate:

- Related/ongoing surgical problem requiring definitive treatment (n=20)
- Related/ongoing symptoms (n=29)
- Surgical complications (n=36)
- Related admission under different speciality (n=12).

During the data collection process, I further excluded one patient from the ‘Related/ongoing surgical problem requiring definitive treatment’ group and five patients from the ‘Related/ongoing symptoms’ as they were not actually accepted by the general surgical team.

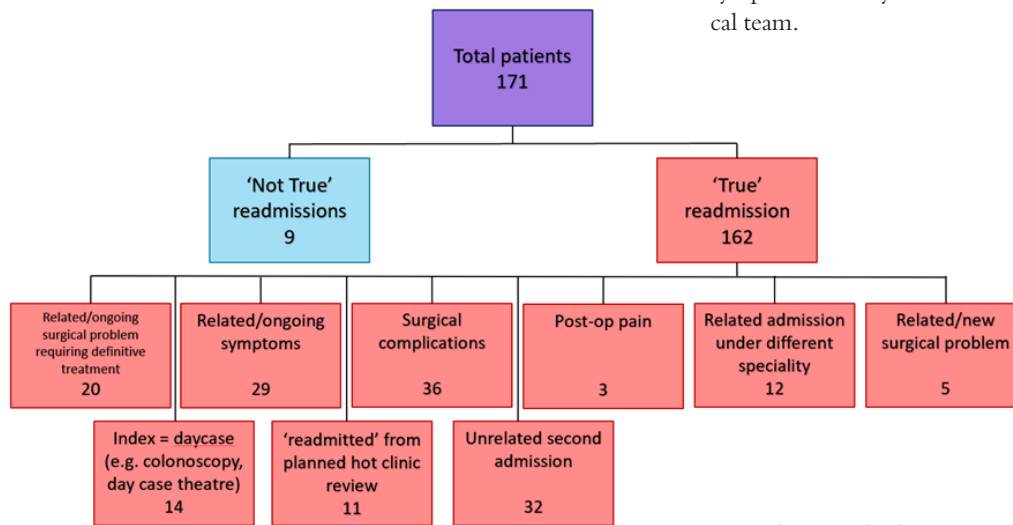


Figure 1: ‘True Readmissions’ Taken from initial study by Dr M. Davenport. Flow chart showing the division of the patients into ‘True’ and ‘Not True’ Readmissions and the further division of the subgroups within ‘true readmission.’

Following the initial study, we decided to further explore these subgroups. As we wanted to focus on the general surgical team and their role within readmissions in our study, we decided to exclude a number of the ‘true’ subgroups. See Table 1 for the reasons behind which subgroups were excluded.

In total, we studied 91 patients in the readmission group:

- Related/ongoing surgical problem requiring definitive treatment (n=19)
- Related/ongoing symptoms (n=24)
- Surgical complications (n=36)
- Related admission under different speciality (n=12).

‘True’ readmission subgroup	Reason for exclusion
Post op pain	The improvement to their management was clear- better pain relief.
Related/new surgical problem	New yet unrelated problems cannot be seen as a failure of the discharge process as they are unpredictable. For example, a patient presenting to A&E with a supraventricular tachycardia fifteen days after having an elective colonoscopy.
Unrelated second admission	
Index = day case	Although these technically should be included, it was found that actually all patients were readmitted with an unrelated problem.
Readmitted from HOTA clinic (acute ambulatory surgical review)	Includes patients who were seen in A&E, sent home with a HOTA clinic appointment and were subsequently admitted from the HOTA clinic. It was acknowledged that the HOTA clinic appointment is a sign that the risk of deterioration and potential further hospitalisation was appreciated at the discharge and therefore the patient was placed on an appropriate pathway.

Table 1: Reasons for the exclusion of patients in the subgroups of ‘true’ readmissions.

The NHS numbers were provided by Hospital Episode Statistics via the Information Business Team at SRFT and the subsequent data collection was performed by the author. Data was input into Microsoft Excel and statistical analysis was performed using StatsDirect.

RESULTS

There were 91 patients in the readmission group. We received data on 3529 general surgical (GS) patients from the Salford Royal Information Business Team who were coded as ‘general surgical’ patients. We excluded 268 as they were not general surgical patients (diagnosis was an orthopaedic, obstetric and gynaecological, medical or neurosurgical problem) and were coding errors. This left 3261 GS patients.

Gallstone Pathology

Gallstone pathology made up 9.26% (n=302) of all GS patients. They accounted for 26.6% (n=24) of the readmission group. Over half of all GS patients with gallstone pathology had surgery during their admission 53.3% (n=161). In contrast, of the gallstone

patients who would be readmitted, only 29.2% (n=7) had surgery during their first admission. Of those patients who did not have surgery on index but were subsequently readmitted, 37.5% (n=9) had ‘definitive’ treatment (either cholecystectomy or endoscopic retrograde cholangiopancreatography) during their second admission.

Surgery on index admission

In the readmission group, 45 % (n=41) of the group had surgery on their index admission, while 37% (n=1206) of all GS patients did. Of those 41 patients in the readmission group who had surgical procedures on index, there were 15 open and 11 laparoscopic abdominal surgeries. A further 14 patients had either superficial (for example abscess incision and drainage) or non-abdominal operations (such as total thyroidectomy). One patient had a cholecystectomy but due to lost notes, it was not clear if it was open or laparoscopic. Whilst 29.7% (n=358) of the surgeries on index of the all GS patients were non-elective, 58.5% (n=24) of surgeries of the readmission group were (Figure 2).

Number of post-operative complications	0	1	2	Total	% of n
Previous cancellations	3	1	1	5	12.5%
No previous cancellations	29	4	2	35	87.5%
Total	32	5	3	40	
% of n	80%	12.5%	7.5%		

Table 2: Number of post-operative complications during first admission for those who were previously cancelled and those who were not

In the group which had been previously cancelled, 40% had a complication, compared to 17.1% of those with no previous cancellations. The patients who had had previous cancellations also experienced a complication per operation rate of 0.6 while those who had not been previously cancelled had a complication per operation rate of 0.229.

Discharge

A discharge summary was not present on the Electronic Patient Record (EPR) for 4.4% (n=4), while 7 discharge summaries did not contain any information for the patient. In total, 12.1% (n=11) did not receive any specific advice on discharge. In addition, only 28.6% (n=26) of patients were given safety-net advice. This is basic, non-specific advice to seek medical attention if the patient becomes unwell or symptoms recur (Table 3).

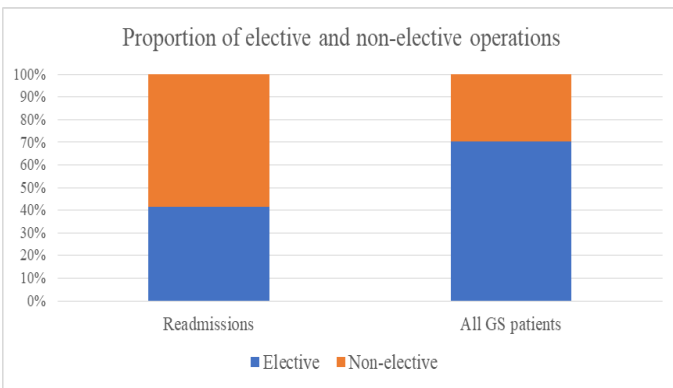


Figure 2: Clustered bar chart showing proportions in percent of Elective and Non-elective surgery of those patients who had surgery at index, comparing all the GS patients and the readmissions group

Post-operative complications

All 41 patients who had surgery at index were readmitted due to complications of their surgery, either returning as a general surgical patient or admitted under another specialty. Of those 41 patients, 78.0% (n=32) did not have an early post-operative complication which was noted during their index admission. Of the 9 patients who had post-operative complications while admitted, 5 (12.2%) had one complication and 4 (9.8%) had two complications. We found no association between intra-abdominal surgery and early post-operative complications which occurred during index admission (p=0.5307) [Chi Square X2 (2, N=41) =1.267, p=0.5307].

Cancellations

Out of the 40 patients who had surgery at index in the readmissions group, 12.5% (n=5) had had their operation previously cancelled (Table 2). As one patient’s pre-operative medical notes could not be found, it was unknown whether they had been cancelled previously or not, hence n=40 in this case.

	N=
No discharge summary	4
No patient information	7
Safety netted	26
Specific patient information	54

Table 3: Table showing the number of patients in the readmissions group receiving varying degrees of written information on the discharge summary following their index admission

Readmission timeline

Over half of the readmissions (54.9%, n=50) were in the first week after discharge, with numbers declining over the next three weeks (n=18, n= 15 and n=8).

DISCUSSION

Emergency readmissions are multifactorial and, to some extent, are inevitable. However, there are some key themes to be drawn from our study.

There is a discrepancy between the percentages of gallstone pathology patients who made up only 9.26% of all of the GS patients, but 26.4% of the readmitted patients. Gallstone disease and the timing of intervention has long been a matter of debate. (14, 15) NICE guidance (updated in 2014) advocates prompt laparoscopic cholecystectomy for patients presenting with acute cholecystitis (within one week of diagnosis). (16) We found that only 29.2% (n=7) of the gallstone patients in the readmissions group had surgery on index admission, while a further 37.5% (n=9), who did not have an operation on index, had 'definitive' emergency treatment on their readmission. SRFT does have a surgical HOT clinic for patients to be seen the next day for biliary tree symptoms, however it seems not all patients who require prompt management are being seen in a timely fashion. In line with some of the literature, our research points to early intervention in gallstone disease, which could help reduce emergency readmissions resulting in emergency or urgent procedures. (14, 15)

It is worrying for clinicians and managers alike that patients with previously cancelled operations had higher rates of early post-operative complications after their subsequent surgery. On the first admission, the 5 patients with at least one cancellation suffered from a 40% post-operative complication rate compared to only a 17.1% complication rate in patients with no cancellations. Patients who had been previously cancelled also had a greater complications per operation rate of 0.6, compared to 0.229 complications per operation in the group who had not been cancelled.

While there is a known relationship between post-operative complications and readmission rates, there is little in the literature on whether previously cancelled operations are related to post-operative complications. (7, 17) In an example from our study, a patient was readmitted as an emergency due to gallbladder pathology two days after their elective laparoscopic cholecystectomy should have taken place. More investigation is needed into the reasons for cancellations and if the cancellations made the subsequent surgery more dangerous for the patients.

Several previous studies reported a higher rate of post-operative complications after intra-abdominal surgery compared to extra-abdominal. (7) No such association was found in this study. The discharge summary informs the patient's GP about their current admission, informs the patient about their admission, gives post-discharge advice and is the written document of verbal advice given in line with NICE Guidance. (16, 18) We found that 4.4% of the readmission patients did not have an initial discharge summary on the EPR system. When there was a discharge summary, the 'Patient Information' section was left blank in 7 of them, leaving 12.1% of patients without written discharge information.

When information is given, it could be clearer and more consistent. Examples included a patient who was readmitted with shortness of breath 21 days after an inguinal hernia repair. Despite clear advice from The Royal College of Surgeons to 'keep moving', this patient was only given safety net advice on the discharge summary. (19) On readmission, the patient said he had lain on the sofa for three weeks after being advised to rest following his operation and was diagnosed with a pulmonary embolism and community-acquired pneumonia. In addition, the advice to gallbladder patients was variable. In particular, this concerned advice on a low-fat diet or other dietary triggers following admission and before the elective cholecystectomy, both of which are specifically named in NICE guidance. (16) One of the readmitted patients experienced an attack of acute cholecystitis after eating chips following her first discharge; there was no record that she had received advice about keeping a low-fat diet.

A noticeable absence from the patient information leaflet search engine on the SRFT website is information on gallbladder disease. (19) We have no doubt that the vast majority of the ward team do give advice on discharge to their patients, however there is a lack of written advice in known channels of information and documentation. Given the volume of patients who are readmitted as an emergency with an exacerbation of gallbladder pathology, we advise an accessible information document on the SRFT website. In total, 15 patients (16.5%) received no advice on discharge, or had inadequate advice which could have been implicated in their readmission. This is a target area of improvement. (19) Non-elective surgical procedures during index admission are over-represented in the readmission group compared to the number of non-elective operations on all GS patients. This is in line with other studies in the literature. (17) While it is reasonable to argue that non-elective surgery results in more complications, a longer length of stay and perhaps a worse outcome, the readmission rate is more of an indicator of the discharge process and post-discharge care, rather than the severity of the presenting complaint. (1) Salford has well-established post-discharge care following upper gastro-intestinal, colorectal and anal surgeries, including input from specialist nurses, information leaflets on discharge and regular follow-up. Many of these structures are in place for elective procedures, but the same cannot be said for non-elective.

Limitations

This is a small study over one period, at only one centre. In addition, as the data collection required in-depth review of clinical notes with limited time available, there is less clinical information regarding the GS patient group (n=3261) who were discharged but not readmitted. In addition, due to coding restraints, we were unable to remove the readmissions group from the GS patient group. Therefore, there are clear limitations in analytical comparisons between the two groups. Being an audit, this study has been observational and therefore further analysis is needed to draw any stronger conclusions. Finally, addressing some of the key areas with the general surgical department and then completing the audit cycle

would be the most satisfactory next steps.

CONCLUSION

Our study has further added to the awareness that emergency readmissions of general surgical patients is varied, but that there are key areas in which patient care can be optimised. Further research is needed in the post-discharge care in place for patients who have undergone non-elective operations, in the causes and outcomes of patients who have operations cancelled and if there could be an improvement in the management of gallstone patients. Action is needed in ensuring every patient receives a discharge summary with personal advice.

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REFERENCES

1. NHS England and NHS Improvement: 2017/18 and 2018/19 National Tariff Payment System. [accessed 8 April 2019] Available from: <https://www.networks.nhs.uk/news/national-tariff-payment-system-2017-18-and-2018-19>.
2. Havens JM, Olufaio OA, Cooper Z. Defining Rates and Risk Factors for Readmissions Following Emergency General Surgery. *JAMA Surgery* 2016;151(4):330-6.
doi: 10.1001/jamasurg.2015.4056
PMID: 26559368
3. Garrat P. NHS England and NHS Improvement. Guidance on blended payment for emergency care. [accessed 8 April 2019] Available from: <https://nhsproviders.org/news-blogs/blended-payments-will-a-new-payment-system-help-deliver-the-long-term-plan>.
4. Nuffield Trust. Emergency readmissions. November 2018. [Accessed 10 April 2019] Available from: <https://www.nuffieldtrust.org.uk/resource/emergency-readmissions>.
5. Healthwatch England. Emergency readmissions: What's changed one year on? Newcastle upon Tyne: Healthwatch England. 2018. [Accessed 10 April 2019] Available from: <https://www.healthwatch.co.uk/report/2018-11-14/emergency-readmissions-whats-changed-one-year>.
6. Wiseman JT, Guzman AM, Fernandes-Taylor S, Engelbert TL, Saunders RS, Kent KC. General and Vascular Surgery Readmissions: A Systematic Review. *Journal of the American College of Surgeons*. 2014;219(3):552-69.
doi: 10.1016/j.jamcollsurg.2014.05.007
PMID: 25067801 PMID: PMC4243160
7. Kassin MT, Owen RM, Perez SB, Leeds I, Cox, JC, Schnier K, et al. Risk Factors for 30-Day Hospital Readmission among General Surgery Patients. *Journal of the American College of Surgeons*. 2012; 215(3): 322-30.
doi: 10.1016/j.jamcollsurg.2012.05.024
PMID: 22726893 PMID: PMC3423490
8. Manilich E, Vogel JD, Kiran RP, Church JM, Seyidova-Khoshknabi D, Remzi FH. Key Factors Associated With Postoperative Complications in Patients Undergoing Colorectal Surgery. *Diseases of the Colon & Rectum*. 2013; 56(1): 64-71.
doi: 10.1097/DCR.0b013e31827175f6
PMID: 23222282
9. Dobson MW, Geisler D, Fazio V, Remzi F, Hull T, Vogel J. Minimally invasive surgical wound infections: laparoscopic surgery decreases morbidity of surgical site infections and decreases the cost of wound care. *Colorectal disease*. 2011;13(7):811-5.
doi: 10.1111/j.1463-1318.2010.02302.x
PMID: 20456462
10. Joynt KE, Jha AK. Thirty-Day Readmissions: Truth and Consequences. *New England*

Journal of Medicine 2012;366:1366-9.

doi: 10.1056/NEJMp1201598

PMID: 22455752

11. Salford Royal Foundation Trust Information Business Team. Readmission rates April 2015-July 2018. Salford Royal Foundation Trust Business Team, July 2018 (unpublished).

12. Davenport M, Marks T, Doran H. General Surgery Audit. Salford Royal Foundation Trust. March 2019 (unpublished).

13. Care Quality Commission. Salford Royal NHS Foundation Trust Inspection report. 2018. [Accessed 24 April 2019] Available from: <https://api.cqc.org.uk/public/v1/reports/1d946123-d7ca-4923-99ae-a029ca36fd73>.

14. El Zanati H, Nassar AMH, Zino S, Katbeh T, Ng HJ, Abdellatif A. Gall Bladder Empyema: Early Cholecystectomy during the Index Admission Improves Outcomes. *JLS Journal of the Society of Laparoscopic & Robotic Surgeons*. 2020;24(2).

doi: 10.4293/JLS.2020.00015

PMID: 32425482 PMCID: PMC7208918

15. Cheruvu CVN, Eyre-Brook IA. Consequences of prolonged wait before gallbladder surgery. *Annals of the Royal College of Surgeons of England*. 2002;84(1): 20-2.

PMID: 11892728 PMCID: PMC2503768

16. National Institute of Clinical Excellence (NICE) Guidelines. Gallstone disease: diagnosis and management, clinical guideline [CG188]. 2014. [accessed 17 Oct 2020] Available from <https://www.nice.org.uk/guidance/cg188/chapter/1-Recommendations#managing-gallbladder-stones>.

17. Jacobs B, Hadjittofi C, Taylor F, Davies J, Machesney M. Rethinking surgical readmissions. *Royal College of Surgeons Bulletin*. 2018; 100(2):104-8.

doi: 10.1308/rcsbull.2018.104

18. Shastri A, Bangar S, Waldman S, Esfahani E, Brindle N. Content and Timing of Inpatient Discharge Summaries at the Mount. *British Journal of Medical Practitioners*. 2014;7(3):a726.

19. Royal College Surgeons of England. Recovering from surgery: Groin Hernia Repair. [accessed 24 Sept 2020] Available from: <https://www.rcseng.ac.uk/patient-care/recovering-from-surgery/groin-hernia-repair/what-to-expect-after-the-operation/>.

20. Salford Royal Foundation Trust Website. Patient Leaflets. [accessed 17 May 2019] Available from <http://www.srft.nhs.uk/for-patients/patient-leaflets/>.

21. Pieper B, Sieggreen M, Freeland B, Kulwicki P, Frattaroli M, Sidor D, Palleschi TM et al. Discharge Information Needs of Patients After Surgery. *Journal of Wound, Ostomy and Continence Nursing*. 2006;33(3):281-90.

doi: 10.1097/00152192-200605000-00009



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