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Original Research Article

Cost effectiveness of routine histology for haemorrhoidectomy specimens

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ABSTRACT

Background: Routine histology for haemorrhoidectomy specimens remains commonplace in clinical practice, as a method of detecting incidental anal cancer. However, its utility and cost-effectiveness is unclear in the literature. This study aimed to determine the cost-effectiveness of routine histology for haemorrhoidectomy specimens in a regional Australian hospital. The secondary aim was to determine the proportion of specimens sent for histology, and whether individual surgeons had a statistically significant preference for whether to send for histology.
Methods: This was a retrospective cohort study of patients who received haemorrhoidectomies at Hervey Bay Hospital between March 2012 and May 2020. Cost effectiveness of routine histology was investigated by weighing the number of incidental anal cancers detected against the cost of analysis. The proportion sent for histology was determined, both as a whole and by individual consultant surgeons.
Results: Routine histology was ordered in 65% of patients who received haemorrhoidectomies over the study period (n=119), costing $13,623 AUD ($1,651 AUD per year). No cases of incidental anal dysplasia or neoplasia were found. Only 1 of the 8 most prolific surgeons over the study period demonstrated a statistically significant preference for whether to send for histology.
Conclusions: Our study does not support routine histology for haemorrhoidectomy specimens as a cost-effective practice for detecting incidental anal cancer. Most individual surgeons did not display a clear preference for whether to send for histology.

Keywords: Anal, Cancer, Cost, Haemorrhoid, Histology, Value

INTRODUCTION

Haemorrhoids are an enlargement of the normal anal cushions, caused by engorgement of the internal rectal venous plexus.[1] Typically, they present sub-acutely with painless rectal bleeding or prolapse; or acutely with pain related to strangulation and/or thrombosis.[1] Surgical management by excision may be indicated when haemorrhoids are refractory to non-surgical management, high graded and symptomatic, or complicated (by strangulation and/or thrombosis).[2]

The routine histopathological assessment of haemorrhoidectomy specimens is commonplace in clinical practice and may be seen as an opportunity to detect incidental anal cancer.[3] However, there is controversy in the literature regarding its utility and its cost-effectiveness in Australia has not been examined.[3-10]

In an Italian study of 3017 haemorrhoidectomies sent for histology, 65 (2.15%) showed unexpected lesions and in 30 (0.99%) it changed follow-up or treatment.[3] The cost per incidental lesion was 4445.03 Euros ($5,377 USD).[3] Other retrospective cohort studies have shown unsuspected neoplastic or dysplastic lesions in 0.014%-1.9% of haemorrhoidectomy specimens.[4-8] If not for routine histology (where there was no preoperative or intraoperative suspicion), these incidental cases would

have remained undetected and ongoing management may have been delayed or missed.[3,9,10]

The benefit of detection of these incidental lesions must be weighed against the cost of histology. Our retrospective cohort study aimed to evaluate the cost effectiveness of routine histology for haemorrhoidectomy specimens, in a regional hospital in Australia. We calculated the cost of sending haemorrhoidectomy specimens for routine histology and weighed this against the proportion of specimens showing dysplasia or neoplasia.

The secondary aim was to evaluate the proportion of haemorrhoidectomy specimens sent for routine histology, and if the surgeon's responsible had a statistically significant preference for whether to send for histology.

METHODS

This was a retrospective cohort study of 119 patients who underwent haemorrhoidectomies at Hervey Bay Hospital between 1st March 2012 and 18th May 2020. Study participants were identified using electronic records from operating room management information system (ORMIS). Electronic records from The Viewer were used to find operation reports and histology results for these patients. The inclusion criterion was undergoing haemorrhoidectomy at Hervey Bay Hospital within the study period. The exclusion criterion was preoperative or intraoperative suspicion of a lesion other than haemorrhoids.

Patient demographics and consultant surgeon were collected from operation reports. Operation reports and clinical details on histology reports were used to determine if there was clinical suspicion of dysplasia or neoplasia intraoperatively. The presence of histology reports was used to determine whether specimens were sent for histology and the contents showed whether dysplasia or neoplasia was found.

A total of 129 participants were identified from ORMIS as having received haemorrhoidectomies over the study period. Ten were excluded for preoperative or intraoperative suspicion of a lesion other than haemorrhoids (skin tags, anal polyps). The remaining 119 patients formed the final cohort.

Statistical analysis was completed in Microsoft Excel. The proportion of haemorrhoidectomy specimens sent for histology by each surgeon was calculated, and Fisher's exact test was used to assess for a significant difference between the proportion sent for histology by each surgeon and 0.5. This determined if individual surgeons had a statistically significant preference for whether to send for routine histology. Fisher's exact test was used rather than a Chi Squared test due to small sample size.[11]

The cost of transport and histological analysis of haemorrhoidectomy specimens was ascertained from the Pathology department at Hervey Bay Hospital. Currency conversions were made as at 25/04/2021, when $1 AUD was equivalent to $0.77 USD, and 1 Euro was equivalent to $1.21 USD.

Ethics approval and a waiver of consent were attained from the Royal Brisbane and Women's Hospital Human Research Ethics Committee.

RESULTS

Over the study period, 119 patients received haemorrhoidectomies at Hervey Bay Hospital where there was no preoperative or intraoperative suspicion of lesions other than haemorrhoids. These patients were aged between 21 and 82, with a median age of 54. Table 1 shows number of patients by age range.

Table 1: Age at operation of patients receiving haemorrhoidectomies.

Age (years)	Number
21-30	6
31-40	24
41-50	22
51-60	22
61-70	23
71-80	19
81-90	3

Of the 119 patients, 65% (n=78) had tissue specimens sent for histology. None showed dysplasia or neoplasia.

The estimated cost of transport and histological analysis for each sample was $174.65 AUD ($135 USD). Over the study period, routine histological analysis of haemorrhoidectomy samples cost the health service $13,623 AUD ($10,546 USD). On average, this equated to $1,651 AUD ($1,278 USD) per year.

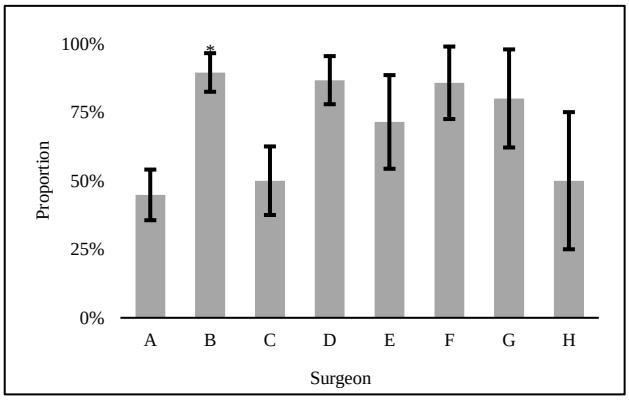

Figure 1 Proportion of haemorrhoidectomy specimens sent for histology by individual consultant surgeons.
*denotes significant difference ($p<0.05$) between proportion sent for histology and 50%. Error bars show standard error.

Twenty-three surgeons performed haemorrhoidectomies over the study period. Eight surgeons performed greater than 2 haemorrhoidectomies. Figure 1 shows the proportion of haemorrhoidectomy specimens sent by each of these surgeons for routine histology. Surgeon B sent 89% of haemorrhoidectomy specimens for histology, significantly more than 50% ($p<0.05$). No other surgeon sent significantly more or less than 50% of haemorrhoidectomy specimens for routine histology.

DISCUSSION

Over the study period, $13,623 AUD ($10,546 USD) was spent on histological analysis of haemorrhoidectomy samples, in cases where there was no pre-operative or intra-operative suspicion of alternative pathology. An accurate cost per incidental lesion could not be determined as there was not a single case of incidental dysplasia or neoplasia, however it must be at least $13,623 AUD ($10,546 USD).

This cost was greater than a recent study which quoted 4445.03 Euros ($5,377 USD) per incidental lesion.[3] The difference is explained by the higher cost of histology in our study in regional Australia ($135 USD per specimen) in comparison to metropolitan Italy ($53 USD per specimen).[3]

Despite routine histology of haemorrhoidectomy specimens being controversial in the literature, our study showed a high proportion of specimens (65%) were still sent for histology.[3-10] The reason for this is unclear however several factors may contribute, including the decision being made by junior surgical doctors and individual patient risk stratification.

Figure 1 shows that consultant surgeons sent between 45% and 89% of haemorrhoidectomy specimens for histology. Only surgeon B demonstrated a statistically significant preference for whether to send for histology. This indicates that in general; either the consultant surgeons do not have a clear preference on whether the send for routine histology, or the decision is being made by registrars and other junior doctors. At our study centre, there were no guidelines to act as decision aids. As a result, registrars may have been inclined to send for histology in cases where they were unsure of the consultant preference. This would have elevated the proportion of specimens sent for routine histology.

Individual risk stratification for anal malignancy may also influence the decision of whether to send for histology. These risk factors include human papilloma virus (HPV) or HIV infection, immunosuppression, smoking, Crohn's disease, female gender, multiple sexual partners, receptive anal intercourse and history of cervical, vulvar or vaginal carcinoma.[12] If any of these were present, the surgeon may have been more inclined to send for histology. As our study did not record whether these factors were present, this may have artificially elevated the proportion of haemorrhoidectomy specimens sent for routine histology.

Limitations included small sample size and lack of clear documentation of preoperative or intraoperative suspicion. Given the low rates of incidental anal dysplasia and neoplasia reported in the literature, larger sample size is needed to comment definitively on cost effectiveness of histology. Documentation from operation notes and histology requests, predominantly written by registrars, may not always convey an intraoperative suspicion of malignancy, which would otherwise justify sending the specimen for histology.

Future studies could involve multiple centres to achieve a larger sample size. The proportion of haemorrhoidectomy specimens sent for histology could be correlated with known anal cancer risk factors, to assess whether individual risk stratification is guiding whether to send for histology. Guidelines incorporating this data could then be implemented to aid the decision of whether to send haemorrhoidectomy specimens for histology.

CONCLUSION

Our study does not support the routine histological analysis of haemorrhoidectomy specimens as a cost-effective method for detecting anal dysplasia or neoplasia. This does not extend to cases where there is preoperative or intraoperative suspicion, or when risk factors for anal cancer are present- and histological analysis should be considered for these patients. Most consultant surgeons either did not have a clear preference on whether to send for histology or other (junior) doctors were making the decision.

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