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BSG/ACPGBI guidance on the management of colorectal polyps in patients with limited life expectancy

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► Additional supplemental material is published online only. To view, please visit the journal online (https://doi.org/10.1136/gutjnl-2025-335047).

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Received 7 February 2025
Accepted 11 April 2025

To cite: Rutter MD, Ranjan R, Westwood C, *et al*. *Gut* Epub ahead of print: [*please include* Day Month Year]. doi:10.1136/gutjnl-2025-335047

ABSTRACT

Background Determining optimal management of colorectal polyps in patients with limited life expectancy of under 10 years can be difficult, due to challenges balancing an uncertain natural history of polyp progression to symptomatic malignancy versus the increased risk and consequences of polypectomy complications.

Aim This British Society of Gastroenterology and Association of Coloproctologists of Great Britain and Ireland guidance aims to help clinicians and patients consider these risks to aid decision-making for polypectomy versus a conservative approach.

Methods A guidance development group comprising 28 members was established, including gastroenterologists, colorectal surgeons, elderly care physicians, anaesthetists, epidemiologists, nurse endoscopists, a general practitioner and patient representatives. Estimates on life expectancy stratified by age and comorbidity, polyp dwell time for differing polyp sizes, cancer sojourn time and polypectomy complication rates for comorbid/elderly patients both on and off antithrombotic medication were collated from various literature searches. A model was created to compare the risk of symptomatic malignancy in a patient's lifetime against the risk of significant complications.

Results Following a modified Delphi consensus process and after three rounds of voting, 33 recommendations were made within 10 domains (principles, diagnostic investigation, life expectancy, polyp and cancer natural history, polypectomy risks, management recommendations, follow-up, decision-making practicalities, training and education, future research). A table was created, summarising whether polypectomy or conservative management might be the favoured option for 40 clinical scenarios of patients with differing life expectancy, polyp sizes and use of antithrombotic medication.

Conclusions This guidance provides a framework to facilitate more objective and informed decision-making, from which an individualised plan can be developed between the patient and their clinician.

INTRODUCTION

Colorectal cancer (CRC) is the third most common cancer worldwide.[1] Almost all CRCs arise from polyps, although only a small proportion of polyps progress to CRC.[2] In most cases, progression follows a timeline of at least a decade from inception to CRC development. As the endoscopist cannot predict which polyp will progress to CRC, they will usually remove all: this necessarily involves overtreatment. For patients without substantial comorbidity, the risk from overtreatment (complications from the endoscopic procedure) is small; hence, in general, the balance favours polypectomy.[3]

Polyps are increasingly diagnosed in elderly patients and those with significant comorbidity, due to an ageing population, a lower threshold for lower GI investigation and better polyp detection at colonoscopy. In people whose life expectancy is anticipated to be less than a decade, the likelihood of overtreatment increases, as there is less time for any polyp to progress to symptomatic CRC within their lifetime. Patients with limited life expectancy also have an increased risk of procedure-related complications, both from endoscopic therapy and from the diagnostic procedure itself (including from bowel preparation and potential cessation of antithrombotic medication).[4 5] Moreover, the risk of morbidity and mortality following a complication also increases. Hence the risk: benefit balance changes, and there may be times when there is either little chance of benefit from polypectomy, or where the risk of harm exceeds any potential benefit: sometimes doing nothing is the wisest option.[4 6]

It can be difficult for patients and clinicians to understand and balance the risk of immediate harm from endoscopic procedural complications with a patient's future risk of harm from potentially developing a symptomatic CRC if a polyp is not removed. A qualitative study of decision-making in the management of complex colorectal polyps in patients with limited life expectancy revealed that uncertainties such as polyp dwell time, life expectancy and polypectomy risk led to variation in practice, perhaps most commonly favouring

overtreatment (polypectomy).[7] These challenges and inconsistencies prompted the development of this consensus guidance, with the aim of helping clinicians and patients make more informed decisions.

METHODS

This consensus guidance was developed in accordance with British Society of Gastroenterology (BSG) guidance methodology.[8]

Guidance development group

Approval was granted by the BSG and Association of Coloproctologists of Great Britain and Ireland (ACPGBI) for the creation of this joint guidance. A steering group was formed to develop the guidance development group (GDG) and to draft potential domains and questions (online supplemental appendix 1). The GDG comprised gastroenterologists, colorectal surgeons, clinical (nurse) endoscopists, geriatricians, anaesthetists, general practitioners, epidemiologists and public representatives. Members were recommended by the steering group, societies and the GDG itself, based on those with prior participation in or publication of similar work. The first meeting of GDG was convened online, and the draft guidance domains and questions, along with GDG membership, were reviewed and revised. All members completed conflict of interest forms and no conflicts of significance were identified.

Evidence and literature search

Literature searches were performed to provide the evidence base for the guidance. A systematic review of published evidence for polyp dwell time was performed (details provided in online supplemental appendix 2). Literature searches were performed on CRC sojourn time, life expectancy scores and colonoscopy and polypectomy risks in elderly and comorbid populations, using combinations of the Medical Subject Headings search terms: colonoscopy, colorectal neoplasms, adverse effects, age, comorbidity and life expectancy, along with other search terms including elderly, complications, polypectomy, colonic polyps. Identified abstracts were hand-searched and relevant papers accessed. Backwards citation searching was performed to identify other relevant papers, and additional references were provided by members of GDG.

Assessment of evidence and formulation of recommendations

The development of this guidance was in line with the Grading of Recommendations Assessment, Development and Evaluation (GRADE). During guidance planning, it was apparent that the questions would not be conducive to formal GRADE recommendations, due to a lack of high-quality data. Therefore, good practice statements (GPS) and expert opinion (EO) statements were developed.[9]

The conservative management and polypectomy models

A semi-Markov state-transition model was created to simulate the clinical outcomes of comorbid or elderly patients with conservatively managed polyps of different sizes. Models of 1000 patients were run for various 'clinical scenarios' of different polyp sizes (1–5 mm, 6–9 mm, 10–19 mm and ≥20 mm) and for all Charlson Comorbidity Index (CCI) scores. The conservative management model and its assumptions are described in detail in online supplemental appendix 5. Sensitivity analyses were run for various alternative scenarios, including shorter/longer life expectancy for each CCI score, shorter/longer polyp dwell times and shorter/longer cancer sojourn times and differing polypectomy risks.

A separate polypectomy model was created to estimate outcomes following therapeutic intervention (ie, polypectomy) for each clinical scenario. During analysis of the evidence, it became clear that the use of antithrombotic medication was an important factor in the overall risk of a significant adverse event (both bleeding and a thromboembolic event). Therefore, separate risk models were created for patients taking these medications. The polypectomy model and its assumptions are described in detail in online supplemental appendix 5.

The number of clinical cancers in the conservatively managed scenario was compared with the number of significant adverse events in the polypectomy model. A table of recommendations was created, by comparing the conservative and polypectomy model outcomes for each clinical scenario (table 1). Recommendations were categorised as 'favours resection' or 'favours conservative management', where the model clearly favoured one or the other; where the two model outcomes were similar (within 25% of one another, or numerically comparable), a category of 'marginal' was used. A summary of role-specific recommendations has been suggested too (table 2).

Table 1 Decision aid: estimated risk of adverse events for polypectomy versus risk of cancer

	Not on antithrombotic medication				On antithrombotic medication			
	1–5 mm 10 AE	6–9 mm 15 AE	10–19 mm 25 AE	≥20 mm 45 AE	1–5 mm 30 AE	6–9 mm 45 AE	10–19 mm 75 AE	≥20 mm 135 AE
CCI 3	7C@8y	37C@9y	117C@9y	349C@11y	7C@8y	37C@9y	117C@9y	349C@11y
CCI 4	5C@7y	25C@7y	81C@7y	256C@8y	5C@7y	25C@7y	81C@7y	256C@8y
CCI 5	3C@5y	13C@5y	41C@5y	161C@6y	3C@5y	13C@5y	41C@5y	161C@6y
CCI 6	1C@4y	6C@4y	19C@4y	56C@4y	1C@4y	6C@4y	19C@4y	56C@4y
CCI≥7	0C@3y	0C@3y	0C@3y	0C@3y	0C@3y	0C@3y	0C@3y	0C@3y

Polyp size in mm.
This table is a decision aid to help guide decision-making discussions between clinicians and patients. Decisions must be tailored to each individual, and this decision aid should not be seen as providing a definitive answer.
The RAG rating provides a simple starting point to guide decision-making discussion. Red: favour conservative management; Amber: marginal; Green: favour polypectomy.
The inset figures are modelled estimates based on many assumptions where the evidence base is weak. They should be used with caution and should not be taken as factual, but may help frame a more detailed discussion with the patient.
(a) C @ (b) y = (a) cancers at (b) years per 1000 patients; where b years is the estimated mean life expectancy.
The estimated 10-year survival provided by CCI calculators is not required for this guidance (see manuscript text).
AE, estimated adverse events per 1000 patients; CCI, age-adjusted Charlson Comorbidity Index score.

Table 2 Summary of role-specific recommendations

Diagnostic referral	
Referrer	Consider comorbidity and frailty when discussing referrals with patients. If referral is appropriate, include frailty score (and CCI) if possible.
Endoscopy booking (admin) team	Collaborate with the clinical team to create a process for identifying patients with frailty or significant comorbidity who need to be escalated to the clinical team for review.
Referral letter/preassessment team	Identify patients with frailty and comorbidities; calculate frailty score and CCI if possible; refer the patient to clinic to permit further patient assessment and discussion of options.
Clinic consultation	Evaluate the patient and determine their frailty score and CCI. Discuss possible options, considering conservative management when suitable. If a diagnostic test is appropriate, choose the correct test for the patient and establish a management ceiling with them.
Postdiagnostic procedure polyp management decisions	
Referrals to polyp MDT	Include CCI score with the referral.
Polyp MDT	Consider the CCI score from the online CCI calculator when evaluating management options (only the CCI score is needed, not the estimated 10-year % survival). Use the guidance table to inform recommendations.
Discussion with patient	Use the guidance table as a foundation for shared decision-making, and tailor decisions based on specific case details and patient preferences.

CCI, Charlson Comorbidity Index; MDT, multi-disciplinary team.

Face validity of the model was assessed by applying it to 40 real-life examples of patients with conservatively managed polyps.

A lay summary (online supplemental appendix 3) and clinical examples (online supplemental appendix 4) were also developed, along with a summary algorithm (figure 1).

RESULTS

In three rounds of voting, consensus was reached on 86 statements. 53 statements were either downgraded to supporting text or merged. The final document has 33 statements (online supplemental appendix 6).

Guidance aims, definitions and exclusions

- The aim of this guidance is to support patients with limited life expectancy, and their clinical teams, in informed decision-making regarding polyp management, by providing a more objective framework.
- For this guidance, we define limited life expectancy as mean life expectancy of less than 10 years, as this covers the timescale when overtreatment is most prevalent.
- This guidance does not cover people with transient illness or transient frailty.
- This guidance does not cover people who have been diagnosed with CRC.
- This guidance does not cover people with hereditary polyposis, genetic CRC syndromes or inflammatory bowel disease.

Various factors should be considered when determining management options and optimal management of polyps in patients with limited life expectancy, including patient-related, polyp-related and therapy-related considerations. Patient-related considerations include estimated life expectancy, functional status and potential resilience to any procedural complication, and the patient's wishes and concerns. Polyp-related considerations include size, morphology, location, multiplicity, pathological polyp type, risk of the polyp harbouring malignancy and risk of future progression to malignancy, along with whether the polyp is causing the patient troublesome symptoms. Therapy-related considerations include the therapeutic options available, likelihood of success, procedure-specific complexity of polypectomy and the likelihood of complications.

In some scenarios, either option (polypectomy or conservative management) may be acceptable: for example, overtreatment where the patient comes to no harm. As with any guidance, there will be cases where the preferred option for a scenario proves wrong for a particular patient (either harm from therapy or harm from symptomatic CRC). However, the aim of this guidance is to maximise the proportion of optimal decisions and to minimise overall harm.

Diagnostic investigation

- GPS: We recommend that patients with a limited life expectancy should only undergo diagnostic colorectal investigations if the outcome of the investigation has the potential to benefit the patient and that the patient or their representative should be involved in any decision to investigate.
- GPS: We recommend that if investigation is deemed appropriate for prognostication in a patient unfit for intervention, to reduce harm from overdiagnosis or overtreatment of irrelevant benign polyps, that CT abdomen/pelvis is undertaken rather than colonoscopy or CT colonography (CTC).
- GPS: We recommend that prior to a diagnostic procedure in all patients with frailty or a limited life expectancy, a clear threshold for therapy is set and discussed with the patient or their representative as part of the informed consent process.
- EO: While it is preferable to set the threshold for therapy prior to the procedure, if an endoscopist needs to make a periprocedural management decision about a polyp during a diagnostic procedure, in general, it is safe to remove polyps amenable to cold snare resection if appropriate.

The fundamental principle of medical ethics—first, do no harm—should be borne in mind when planning investigation or intervention. Particularly in patients with limited life expectancy due to comorbidity or frailty, the effects of intervention on their quality of life, consequences of complications from intervention, as well as their ability to recover from side effects of invasive intervention can be profound and need to be considered when making such decisions. Even a diagnostic investigation may cause unnecessary discomfort and anxiety, especially if an individual is too frail for an intervention, or an intervention is deemed futile. In general, diagnostic colorectal investigation should be avoided in patients with limited life expectancy unless the patient is experiencing troublesome symptoms that require a diagnosis to aid management, or unless the patient would be fit for intervention where CRC is to be detected.

Primary care may have additional information on how an individual has coped physically and psychologically in previous

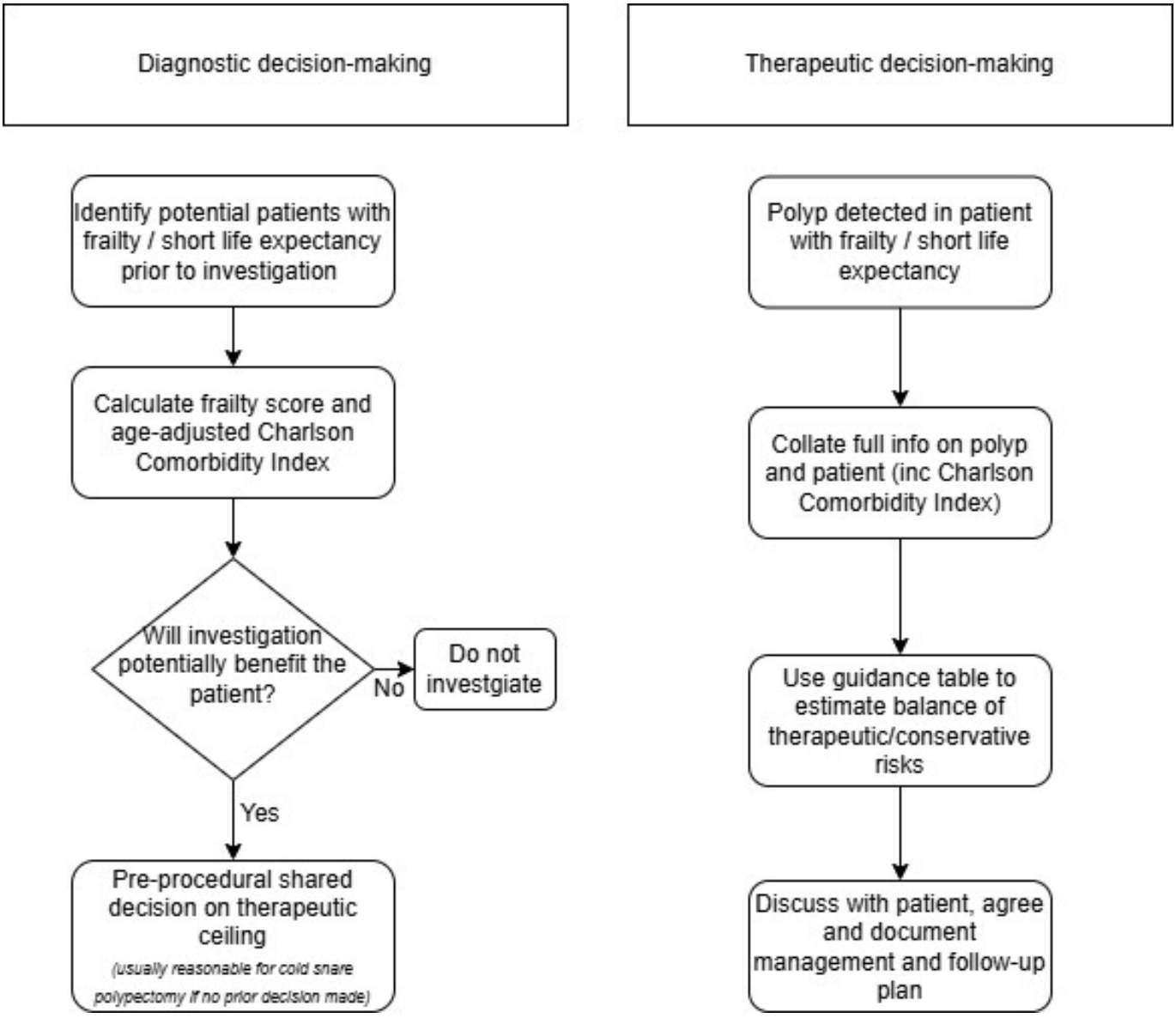

Figure 1 Summary algorithm of guidance.

times of physiological stress, and this information may be helpful in decision-making. It is important to support patients and their advocates in understanding the risks and the benefits to help them in shared decision-making.

In the event of a less invasive investigation such as a CT scan being planned for prognostication only, the purpose and limitations of the investigation should be explained, that is, that it is to rule out significant pathology, but other incidental clinically insignificant findings may be found. For patients with limited life expectancy undergoing colonoscopy, the consent process should include discussion about thresholds of therapy with reasoning based on this guidance.

The balance of risk and benefit is different during the procedure, because the patient will have already been exposed to certain risks (eg, the risks of stopping antithrombotic medication, sedation and bowel preparation). Hence, it is preferable to make decisions regarding the value of diagnostic investigation and the threshold for therapy prior to the procedure. When this has not occurred, and the endoscopist must make a periprocedural decision regarding polyp resection, they must also weigh the risk of deferring therapy which might subject the patient to additional risks of a subsequent therapeutic procedure. In general, it is safe to remove polyps up to 10 mm as they are amenable to the safer technique of cold snare resection, although it is preferable to follow the more detailed polyp-specific and patient-specific recommendations in this guidance where possible.

Understanding life expectancy, comorbidity and frailty in the context of decision-making for colorectal polyps

- EO: Quantification of life expectancy of an individual is challenging and imprecise. While comorbidity indices remain imperfect in predicting the life expectancy of an individual with advanced age or significant comorbidities, they do provide a more objective assessment which can aid decision-making.
- EO: The Rockwood Clinical Frailty Scale or Electronic Frailty Index may also aid the identification of patients with limited life expectancy.

- GPS: We recommend that the CCI is most suited for estimating life expectancy in patients being considered for diagnostic colorectal investigation or therapeutic intervention.

For this guidance, tools that predict life expectancy over a period of at least 10 years are required, to align with the natural history of CRC progression from premalignant polyps. Clinical guidelines relating to colorectal polyps already exist that use a similar life expectancy of 10 years.[10]

Life expectancy is notoriously difficult to predict. Life expectancy can be calculated for any age, estimating the average additional years a person can expect to live given the age they have attained. Estimates will depend on the characteristics of the population being studied and are, by necessity, an average for the cohort. Such age-based life expectancy estimates do not consider person-specific factors such as comorbid health conditions. They should, therefore, be interpreted within a range of uncertainty. Average age-based life expectancy for a UK population is available from the Office of National Statistics.[11] Broadly, people aged 80 years or older have a life expectancy of 10 years or fewer.

With ageing, we often tend to accumulate chronic health conditions and diseases, often referred to as comorbidity or 'multi-morbidity' (the presence of two or more such chronic conditions). This is increasing in prevalence, with estimates suggesting that below the age of 65 years, it is present in approximately 30% of adults, whereas in those above the age of 65 years it is substantially higher, affecting up to 93%.[12 13]

Frailty is often defined as a multidimensional and dynamic condition characterised by declines in reserve and function across multiple physiological systems, such that the ability to cope with everyday or acute stressors becomes compromised.[14] The overall prevalence of frailty is variable depending on age, clinical population, morbidity, setting and the operational definition used for the classification. It is generally accepted to be 10.7% in community-dwelling older adults, 47.4% in geriatric hospital inpatients and 52.3% in older adults in nursing homes.[14]

Frailty and comorbidity are distinct entities but have significant overlap. There are several practical ways of assessing frailty and comorbidity, with various indices often used in community and hospital practice.[15–18] Frailty indices are available but are aimed at identifying people whose decline in several physiological systems leaves them vulnerable to health deterioration from relatively minor stressor events. Therefore, while they may be helpful in identifying patients in whom this guidance is applicable, they are of limited use when estimating life expectancy over a longer period.

We suggest the CCI is most suited for estimating life expectancy for this guidance. The CCI is the most validated and widely used score that stratifies life expectancy up to 10 years.[19] An age-adjusted version was subsequently developed and validated.[20] We opted to use the age-adjusted CCI for our model. The CCI has been used on many different patient cohorts across the world, in both hospital and community settings. Our model required granular data including 1-year mortality for a comparable population (ie, community-based). We identified a large, community-based study that provided 1-year mortality rates for each CCI score.[21] These data were sense-checked against a CCI study using UK primary care data (summary data provided by the lead author).[22]

Various online age-adjusted CCI calculators are available, including https://www.mdcalc.com/calc/3917/charlson-comorbidity-index-cci. This tool can be used to calculate the CCI score, which can then be used for this guidance to aid decision-making. The 'estimated 10-year survival' provided by such online calculators is not required for the purpose of this guidance, as explained in the previous paragraph. The early identification of patients with frailty and comorbidity is important, facilitated by calculation of the appropriate score, so that different management options can be considered and discussed with the patient. Ideally, this would occur prior to the decision to refer or at the time of referral. Hence, outpatient clinic review prior to requesting the procedure will usually be appropriate for patients with high CCI or frailty scores.

Understanding the risk of polyp progression to symptomatic cancer

- EO: While polyp dwell time is imprecise and will vary, we estimate that in general, in an elderly population, the average annual cancer transition rate from polyps is approximately 10% for polyps≥20 mm, 3.3% for polyps 10–19 mm, 1% for polyps 6–9 mm and 0.2% for polyps 1–5 mm in size.
- EO: While cancer sojourn time will vary, we estimate that an asymptomatic cancer takes an average of 3 years, and up to 6 years, before it causes symptoms.

Only a minority of polyps progress to CRC, and even when they do, there is usually considerable lag time in the progression of a precancerous polyp to malignancy and CRC-related death.[23] Thus, many elderly or comorbid individuals will be more likely to die of natural causes than from CRC.

Several clinical guidelines relating to colorectal polyps, including colon capsule endoscopy and CTC, already include recommendations for conservative management of certain polyps.[24]

Our systematic review revealed a few small observational studies of polyp dwell time, along with a few modelling studies. Due to study heterogeneity, statistical pooling of data was not feasible. Therefore, the steering group selected studies that best presented the data required for this guidance. We opted to base our polyp natural history model on Brenner's study,[23] because it was large scale (3.6 million screening colonoscopies), relatively contemporaneous and provided granular annual transition rate data, including by 5-year age cohorts and both for transitions from non-advanced to advanced adenomas, and from advanced adenomas to CRC. The GDG also acknowledged that compared with other studies, this study's transition estimates were at the higher end of the range, which was felt to be prudently cautious for the first iteration of this guidance.

The granularity of these transition estimates was further enhanced by applying more detailed data on the relative proportions and malignancy rates by adenoma size from a large, English study.[25] This allowed annual CRC transition rates from various polyp sizes to be estimated.

A fixed cancer sojourn time of 3 years was used for the model, based on the Nordic-European Initiative on Colorectal Cancer (NordICC) trial, which showed control/intervention cancer cross-over at 6 years, essentially indicating that all asymptomatic cancers had been detected by 6 years, giving a mean sojourn time of 3 years.[26] This was acknowledged by the GDG to be at the more rapid end of sojourn times from studies and models. Other models have used rates of up to mean 6.7 years sojourn time.[27]

Assessing polyps and understanding the risk of complications from polypectomy

- GPS: We recommend all polyps are carefully assessed for endoscopic features that the lesion might be harbouring cancer.

- GPS: We recommend that the SMSA (Size, Morphology, Site, Access) scoring system is used to assess the complexity of a polypectomy
- GPS: We recommend that the risk of overtreatment, which unnecessarily exposes a patient to the risk of complications without benefit, should be considered when making management decisions for a colorectal polyp.
- GPS: We recommend preferential use of cold snare polypectomy where appropriate, as it has reduced risk of delayed bleeding, perforation, postpolypectomy syndrome, is quicker and more cost effective.
- EO: Polyp factors for complications primarily relate to the size of the polyp and caecal location.
- EO: Patient factors for complications include advanced age, antithrombotic medication and comorbidities such as cardiopulmonary or renal disease.
- GPS: We recommend that the additional risk of a thromboembolic event due to cessation of antithrombotic medication should be taken into consideration when making a polyp management decision.—this is particularly pertinent with small polyps, where the risk of a thromboembolic event or other complication might be greater than the low risk of malignant transformation.
- EO: While there is considerable uncertainty about the risk of polypectomy in people of advanced age and with substantial comorbidity, we estimate the following significant complication (hospitalisation) risk per 1000 elderly/comorbid patients, which includes both the colonoscopy risk and the polypectomy-specific risk:
  - 1–5 mm polypectomy: 10 (30 if on antithrombotic medication).
  - 6–9 mm polypectomy: 15 (45 if on antithrombotic medication).
  - 10–19 mm polypectomy: 25 (75 if on antithrombotic medication).
  - ≥20 mm polypectomy: 45 (135 if on antithrombotic medication).
- EO: The consequences of complications (morbidity and mortality) can be more marked for elderly patients or patients with comorbidities, due to loss of biological reserve and failure of physiological mechanisms.
- GPS: We recommend that, to aid polyp management decision-making, the risk of surgery following an endoscopic complication can be assessed using risk prediction tools such as the ColoRectal Physiological and Operative Severity Score for the enumeration of Mortality and morbidity tool (CR -POSSUM).

Polyps should be assessed thoroughly prior to making a management decision, using existing guidelines for assessing the risk of the presence of cancer in polyp as well as the complexities of polypectomy.[28 29] Care should be taken when interpreting CTC descriptions of polyps: while the endoscopist can assess pit and vascular patterns and look for ulceration or other malignant features, the radiologist cannot, hampering their ability to discriminate between benign and malignant lesions; hence particular care should be taken for lesions of ≥10 mm in size.

Colonoscopy carries the risk of significant procedural adverse events including perforation and bleeding.[30] In addition to the risks of the procedure, there is a risk of renal and cardiovascular compromise associated with the bowel preparation, cardiopulmonary complications associated with sedation and thromboembolic events including major stroke.[31–33] Procedural risks are significantly higher for therapeutic procedures such as polypectomy and increase as the size of polyps increases.[30]

Patients taking antithrombotic medication are at particularly high risk, both of postpolypectomy bleeding and of thromboembolic events on stopping the medication.[34–38] The postpolypectomy bleeding risk can be as high as 10% depending on polyp size, location, morphology and resection technique.[39] Thromboembolic events such as a major stroke can be catastrophic. There is no risk-free option, and the risks and benefits of stopping anticoagulation need to be weighed carefully for every patient.

All risks increase significantly with comorbid conditions[6 40] and frailty[41] and are broadly twice as common in an elderly population.[4 6 40 42 43] Even within an elderly population, increasing age and increasing levels of comorbidity and frailty further increase the risk of both colonoscopy and polypectomy.[42] Surgical risk prediction models such as Cr-POSSUM can help predict mortality in the event of possible complications.[44] Data from NELA (National Emergency Laparotomy Audit) and associated risk prediction tools can be helpful, but can only be used after a complication such as perforation or uncontrolled bleeding has occurred.[45] Cold snare polypectomy with its lower complication rates is preferable wherever possible. The complete resection rates with cold snare are comparable to other polypectomy techniques.[46 47] There is increasing evidence that small polyps can safely be removed without antithrombotic medication cessation (plus or minus endoscopic clipping), which should reduce the risk of thromboembolic events. As with any polyp, an adequately trained endoscopist should undertake the procedure, especially in patients with limited life expectancy, where the risk and implication of complications is higher. Equally important for these patients is clear postprocedure advice about complications and what to do if they occur, as they have less reserve to cope with complications and delays to treatment.

We acknowledge that there is considerable uncertainty surrounding the risk of polypectomy in people of advanced age and with substantial comorbidity. There is no single source of excellent data that takes age, comorbidity, differing polyp sizes and severity of both procedural and non-procedural complications into account. Garcia-Albeniz's study calculated the excess 30-day risk of colonoscopy significant adverse event (hospitalisation) in a 75-year-old to 79-year-old cohort (when compared with a similar cohort not undergoing colonoscopy) as 10.3 per 1000.[48] We have taken this as the baseline risk for our guidance, then adjusted, using data from various other studies quoted above, to estimate the risk in an elderly/comorbid cohort of patients undergoing polypectomy of various sizes, both with/without antithrombotic medication.

Management recommendations

- EO: This guidance is based on modelling and EO and is intended to provide an objective framework to support clinicians and patients during shared decision-making. However, there remains a substantial degree of uncertainty, which should be explained to patients. Decisions will always need to be individualised as they are nuanced and multidimensional.
- GPS: We recommend that polypectomy is only appropriate where the benefit outweighs the risk of harm.
- EO: Polyps rarely cause symptoms, but where the patient is experiencing troublesome symptoms attributable to the polyp, polypectomy might be required for symptom control.
- GPS: We recommend that in the absence of symptoms, the likelihood of a polyp affecting an elderly or comorbid patient's quality of life through progression to a symptomatic cancer during their lifetime should be considered when making management decisions. When there is no

reasonable potential for progression to symptomatic CRC due to limited life expectancy, conservative management should be considered.
- EO: Patients should be informed that a decision to manage a polyp conservatively is reversible if circumstances change.

The model was run multiple times for different clinical scenarios, the results of which are summarised in table 1. More detailed modelling scenarios are provided in online supplemental appendix 7.

It is important to emphasise that while our guidance provides more objective information on which patients and clinicians can make a management decision, individual patients might have different preferences, particularly for areas of uncertainty or where the options are fairly balanced. We highlight that:

Our comparative model assumes parity between substantial harm from therapy (defined as patient hospitalisation) and the development of symptomatic CRC. Some patients might recover fully following hospitalisation from an adverse event, whereas others might not survive; conversely, some patients might die from their CRC, whereas others might have minimal symptoms during their lifetime.

Our model does not consider the timing of those harms. Iatrogenic harm is immediate, whereas harm from a symptomatic cancer occurs several years later. Patient may have different preferences. We acknowledge that health economic modelling incorporating quality-adjusted life-years would likely be more favourable towards conservative management because of this, although deferred treatment costs might be greater.

Our guidance will not cover all scenarios but can form a basis from which individualised decisions can be made. For example, our model does not fully consider polyp multiplicity. While, in general, the risks/benefits of therapy over conservative management can be calculated for, and guided by, the largest polyp, there may be scenarios where a patient with multiple large polyps is considered at greater risk of progression to cancer, or of therapeutic complication, which may influence the management decision.

Follow-up

- GPS: We recommend that patients with a limited life expectancy with conservatively managed polyps usually do not require follow-up and can be discharged to the referring clinician for best supportive care. However, for a selected group of patients in whom the decision has been difficult or marginal, a defined period of follow-up with clear, agreed expectations may be reasonable.
- GPS: We recommend that endoscopic postpolypectomy surveillance for patients with a limited life expectancy is usually not necessary, as the risk of endoscopic procedures is likely to outweigh any benefit.
- GPS: We recommend that both the patient and their referring clinician are provided with clear written information about the conservative management plan, including specific advice on trigger points for patient-initiated follow-up.

The importance of CCI as the indicator for the selection of conservative over interventional management is that the risk–benefit equation will not improve over time. Therefore, in general, it is safe practice to avoid planned follow-up. There will be instances when symptoms arise in patients whose polyps have been managed conservatively; in these circumstances, a senior decision-maker familiar with this guidance should be involved in any re-referral, to avoid any unnecessary and potentially harmful future investigation. At least some of the potential harm of colonoscopy resides in the cessation of antithrombotic medication and the use of bowel preparation medication. Thus, avoiding unnecessary future examination helps minimise this risk. We acknowledge that conservative management will remain a challenging concept for some colleagues and patients.

For patients with limited life expectancy undergoing polypectomy, the standard follow-up with interval colonoscopy or CTC is unlikely to benefit them as the risks of future malignancy in their lifetime would be even lower postresection, but the risk from the procedure will continue to increase with time. Nevertheless, this decision should be individualised, involving the patient, and considering such factors as the quality of the baseline colorectal investigation.

Decision-making practicalities and patient communication

- GPS: We recommend that decisions on the management of complex polyps are supported through case discussion at a dedicated polyp Multi-Discipinary Team (MDT) meeting and that decisions are clearly documented.
- GPS: We recommend that the patient or their advocate should be involved in decision-making on the management of complex colorectal polyps.
- GPS: We recommend that life expectancy and polyp dwell time should be discussed with patients.
- GPS: We recommend that the frequency and the consequences of complications should be considered and discussed with the patient.
- GPS: We recommend that the discussion with the patient or their advocate should happen in an environment separate from endoscopy, preferably in a clinic with the information from a polyp MDT.
- GPS: We recommend that the discussion about polyp management with the patient or patient advocate should be done by a clinician who has sufficient experience with such patients.

Realistic medicine is about providing the care people value and acknowledging that people's priorities may be different from healthcare providers. There should be the right balance between science and the art of care, balancing evidence, professional judgement, people's preference and compassion. This can be achieved by practising the six pillars of realistic medicine, which are: building a personalised approach to care, shared decision making, reducing harm and waste, managing risk better, tackling unwarranted variations and becoming improvers and innovators.[49]

In a qualitative study undertaken to inform the development of this guidance, physicians and surgeons acknowledged difficulties of decision-making, exacerbated by uncertainties with respect to the speed of polyp progression and the estimation of patient life expectancy.[7] Tailoring decisions to the health, context and preferences of individual patients was recognised as crucial. However, discussions with patients can be challenging, not only because of inherent uncertainties, but also difficulties understanding and communicating risk, the possibility of patients' and clinicians' preconceptions of the necessity to intervene to prevent cancer and the need to acknowledge the reality of a patient's limited life expectancy. Objective discussions about life expectancy can improve the consent process, helping individuals and clinicians decide whether to proceed. We hope that this consensus-led, decision-making guidance facilitates such discussions.

Current BSG/ACPGBI guidelines advocate discussion of all patients diagnosed with a complex colorectal polyp within a specific complex colorectal polyp MDT meeting.[28] Ideally, the

complex polyp MDT should be separated from the colorectal MDT, although membership of both groups will often overlap. Membership of the complex polyp MDT should, at least, include representation from operators who perform all options of therapies available. Ideally, a clinician who has met the patient and is able to advocate for their preferences and beliefs should also be present. If this is not possible, then information regarding any preinvestigation or post-polyp diagnosis discussions regarding limits of treatment should be available. It is also useful for the MDT to have available any information on prognosis from preexisting disease such as cancer and calculation of CCI to allow meaningful discussion. With this information to hand, the MDT can shape discussions on treatment options to the individual patient. Risks and benefits of proposed treatments should be documented in the context of the life expectancy of the patient. The ultimate clinical decision is made between the lead clinician and the patient, with the support of information from the MDT to allow an informed decision to be made. Where polyp MDTs are not available, the guidance can still be applied, involving the relevant personnel as necessary.

Following the MDT meeting, options should be communicated with the patient in an outpatient clinic setting. These discussions are complex and should be led by a clinician who is experienced both in complex polyp management and advanced communication. Adequate time should be allocated to allow discussion regarding the implications of a polyp diagnosis and estimated timeline for polyp progression in relation to the life expectancy of the patient.

Implications of therapy, including the frequency and consequences of all potential complications, should be openly discussed within the context of the patient's limited life expectancy. This shared decision-making approach should be taken to reach a joint decision about care when deciding on treatment. Pre-emptive consideration should be given to the management plan were a complication to occur, and whether in that eventuality, it would be feasible to operate. This should be discussed and documented in advance of any therapy.

Sharing treatment decision-making with patients is widely accepted as fundamental to good healthcare.[50] The National Health Service constitution and General Medical Council (GMC) consent principles advocate the involvement of patients, their families and carers. These consultations take time, and it is advocated that a family member or carer be present during the consultation process. Patients should be encouraged to take time to consider the options presented to them: sometimes a second clinic appointment may be necessary, and patients should be informed that any decision to manage a polyp conservatively can be reconsidered if the situation changes.

Examples of the shared decision-making approach are available in online supplemental appendix 4.

Training, education and research questions

During the guidance development process, it was widely acknowledged that upskilling of all colonoscopists and referrers in the identification of patients who might have a limited life expectancy would be beneficial, to reduce the risk of overtreatment and patient harm. The GDG recommended that education should be provided for endoscopists and consenters to facilitate preprocedure decision-making regarding what should/not be removed during that procedure, and it was felt that all endoscopists would benefit from periodic attendance at polyp MDT meetings to develop greater understanding of these complex decision-making processes.

The GDG also identified research and service development priorities:

- Further research is needed to better understand polyp dwell time (including from CTC and colon capsule endoscopy patient cohorts) and cancer sojourn time.
- Further research into the risk of significant adverse events following polypectomy in elderly and comorbid patients, supported by robust case identification and a national reporting system for post-endoscopy unplanned admissions. A structured review of such events (capturing the CCI, the role and type of antithrombotic medication and considering whether the procedure was necessary and whether it contributed to the admission) would allow subsequent refinement of this guidance.
- Further research into how well comorbidity indices and frailty scores predict life expectancy up to 10 years.
- Studies to assess the benefit of conservative management in patients with limited life expectancy, with consideration of a national registry to provide further information.
- Consideration of automatic calculation of the CCI from General Practice (GP) electronic data.
- A greater understanding of public opinion on this topic.
- Consideration that future colonoscopy polyp detection metrics exclude patients aged 80 and over, to reduce perverse incentives for overtreatment.

GUIDANCE REVIEW

We recommend that this guidance should be considered for review between 5 and 10 years from date of publication.

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Acknowledgements We thank Jenny Pipe, ACPGBI patient liaison group member, for her assistance in writing the lay summary. We thank Dr Colin Crooks for his assistance with English primary care population Charlson Comorbidity Index scores.

Contributors MDR was the lead author and chair of Guidance Development Group (GDG), supervised planning, conduct and reporting of this guidance and did the modelling study. RR co-ordinated Delphi process, written initial draft, statements and the manuscript, conducted the qualitative study to explore current practices for management of polyps in patients with limited life expectancy and did a systematic review to assess timeline of progress of colorectal polyps. LS was a GDG member and senior author of this guidance. NM and SS, BSG representative in GDG. KY and RO, ACPGBI representative in GDG. NJT, CW, SD, HB, MSl, AP, BC, AB, ST-G, NEB, RP, LN, MV, JB, NC, PC, SH, JP, EJAM, RH, JC, MSw were GDG members. All GDG members reviewed and apprised the evidence, participated in voting and discussions in Delphi rounds and added their opinions which formed part of discussions in the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Disclaimer This BSG guidance represents a consensus of best practice based on the available evidence at the time of preparation. The guidance may not apply in all situations and should be interpreted in the light of specific clinical situations and resource availability. Further controlled clinical studies may be needed to clarify aspects of these statements, and revision may be necessary as new data appear. Clinical consideration may justify a course of action at variance to these recommendations, but we suggest that reasons for this are documented in the medical record. BSG guidelines are intended to be an educational device to provide information that may assist in providing care to patients. They are not rules and should not be construed as establishing a legal standard of care or as encouraging, advocating, requiring or discouraging any particular treatment.

Competing interests All authors have completed the ICMJE uniform disclosure form. The following competing interests are reported: MDR and SS: undertake paid roles for the Joint Advisory Group for Gastrointestinal Endoscopy and the English Bowel Cancer Screening Programme. PC: has received funding from Intuitive Surgical for a surgical proctorship role, and lecture fees from Johnson and Johnson. ST-G: declares meeting and speaker fees and research fellow university fees from Boston Scientific. NM: declares payment for educational event for Olympus KeyMed.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

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