MDT practice determines treatment pathway for patients with advanced ovarian cancer: A multi-centre observational study

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MDT practice determines treatment pathway for patients with advanced ovarian cancer: a multi-centre observational study

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Abstract

Objective,

To investigate decision making for patients with advanced ovarian cancer as a possible explanation of geographical variation in treatment patterns

Methods

We carried out a multi-centre observational study in multidisciplinary teams meetings for five major UK cancer centres. All patients presenting to five cancer centres with advanced ovarian cancer over a six-week period. The GO-MDT-MODe tool was used to provide a measure of participation and quality of case discussion for all cases of advanced ovarian cancer. MDT scores were correlated with surgical data extracted from national audit data. Data were recorded for overall MDT performance.

Results

A total of 870 case discussions, including 145 cases of advanced ovarian cancer, were observed. MDTs varied in structure, format and time allocation between centres. Cluster analysis showed significant variation in quality and participation of discussion between centres ($p<0.0025$) and this correlated with the proportion of patients in the wider cancer alliance undergoing surgery.

Conclusions

We have shown that at least part of the variation in practice seen in the UK correlates with different behaviours within MDTs. Increasing time for discussion and encouraging participation from all staff groups may increase proportions of patients undergoing optimal treatment regimens.

Introduction

With the development of improved surgery, and the advent of targeted therapies, survival for some patients with advanced ovarian cancer has improved significantly over the last two decades [1]. However, these advances have not translated into improvements for all. Large scale geographical variations continue to exist even within the same jurisdiction, with, for instance, some UK centres achieving survival rates in line with the best in the world, whilst others fall significantly behind [2]. These variations in survival correlate with variations in practice, particularly around primary management of disease [3], a point in the patient pathway when multiple treatment options are available.

For patients with advanced disease, optimal treatment includes both cytoreductive surgery and systemic cytotoxic chemotherapy. However, surgery can be extensive and some patients may not be thought suitable for, or may decline, an operation: in England, 55% of patients with advanced ovarian cancer will receive cytoreductive surgery, varying between 40% and 71% across the English cancer alliances, a difference that cannot be explained by differing patient characteristics alone [3]. Importantly, resection rates correlate with one-year survival rates, which vary from 65% in low resection rate centres to 71% in high resection rate centres ($p<0.05$) [3]. However, optimal rates of surgery, which maximise survival and minimise morbidity, remain undefined.

Randomised controlled trials to compare primary surgery versus a strategy of neoadjuvant chemotherapy with delayed primary surgery have added to the complexity of decision-making by demonstrating broad equivalence [4].

Patients presenting with ovarian cancer would therefore appear to face a bewildering set of choices. However, decisions about treatment are made by specialist multidisciplinary teams (MDTs), a mode of working, which undoubtedly has benefits, but can also become an ‘echo chamber’ of ingrained practice [5]. Specifically, uniformity of decision-making prevents clinicians from examining the counterfactual: “How would this patient respond if treated in a different way from our normal practice?” As a result, MDTs can manage uncertainty poorly, default to one practice [6], and drift away from a norm, leading to geographical variations in practice.

Furthermore, MDT decision-making rarely incorporates patients’ own preferences and is not able to factor in patient views of the trade-offs between survival and quality of life [7].

We hypothesised that there would be an association between MDT behaviour and subsequent clinical practice, specifically that rates of surgery may be influenced by the behaviour of the MDT.

Here we show the results of a multi-centre, observational study using the GO-MDT-MODe tool to measure performance of five separate MDTs, and compare this to surgical practice in these centres.

Methods

Overall design

We carried out a multi-centre, observational study of gynaecological cancer MDTs, focussing on management of advanced ovarian cancer patients undergoing primary treatment.

One of two clinically trained observers (TK and ES) attended MDTs, virtually, at each of five major English cancer centres over a six-week period in May-June 2022. To facilitate staff identification they were provided with staff and patient lists ahead of meetings, but took no active role in any meeting. Data were collected about the overall structure and function of the MDT, timings and duration of each meeting, and overall numbers of cases discussed. No patient identifiable data were collected and therefore ethics approval was deemed unnecessary.

Use of the GO-MDT-MODe tool

The MDT-MODe tool is a validated instrument to measure input and quality of discussions at MDT meetings [8]. It has subsequently been extended to include two ovarian cancer specific fields; "markers" and "genetics" [7], thus generating a gynae oncology specific tool, GO-MDT-MODe tool.

The tool utilizes a five-point Likert scale, with a predefined range of anchor behaviours. A score of 5 represents optimal behaviour, whereas a score of 1 represents poor information or no contribution from the discipline. A score of 3 represents average behaviours. Scores of 2 and 4 describe behaviours that fell between the predefined markers of 1, 3 or 5, presenting the scoring system as graded scale. A score of 0 indicates that the information or team member was not available.

In total, 12 fields are recorded for each patient discussion which fall into two domains, with five fields forming the "case information domain" and seven fields forming the "participation" domain, figure 1.

Outcome data

Data for surgical rates were collated from the Ovarian Cancer Audit Feasibility Pilot dataset using their described methodologies [3]. Briefly, registry level data for all cancer alliances in England were collected for the period 2013 to 2017. Summary findings from the audit have been previously published [3] but primary data remain accessible for interrogation. Rates of surgery (including before and after chemotherapy) were extracted for the five cancer alliances corresponding to the five centres participating in this study. Of note a cancer alliance may contain more than one cancer centre.

Analysis

Data were collected and analysed in MS Excel and Graphpad Prism. Chi squared, ANOVA and Spearman's tests were used for correlative analysis and k-means clustering was used to define groups.

Results

Objective assessment of MDT structures and formats

A total of 870 cases, including 145 cases of advanced ovarian cancer, were observed over 17 separate MDT meetings by one of two observers (TK or ES), table 1.

MDT meetings ran on a weekly basis in all five centres and each was organized by an MDT coordinator. Attendees at all MDTs were provided with a patient list prior to the meeting. There were minor differences in the structure of the patient lists between centres, but they all contained patient demographics, whether imaging and/or histology was ready to be discussed, a summary of the case, and any queries about the patient or the management plan. Each centre acted as a hub for surrounding hospitals, with relevant staff joining virtually in order to present their cases. All MDTs had representation from gynaecological oncologists (surgeons), non-surgical oncologists, radiologists, histopathologists, cancer specialist nurses, consultant gynaecologists, and post graduate doctors in training (junior doctors). All MDTs had a similar structure in which each patient case was summarised by the chair or other relevant clinician. If radiological imaging or pathological reports were relevant and/or ready, imaging was displayed both on screen and virtually, whilst histology was summarised verbally.

However, there were also significant differences in the format of the five MDTs. Centres A and B ran hybrid meetings with a core team present in the MDT room and other joining virtually. Centre C ran meetings virtually, linking up several smaller MDT rooms and centres D and E ran entirely virtual meetings. For those meetings which had a face-to-face element, centre A positioned the team around a conference table whilst centres B and C had a lecture theatre style layout. Centres B and E had the same chair for all meetings during the study whilst centres A, C and D rotated the role of chair.

Meetings also varied in duration and workload ranging from 112 to190 minutes in length and discussing between 30 and 90 cases per meeting, the mean length of discussion ranging from 1.58 minutes per case in centre C to 4.04 minutes in centre A, table 1.

Quality metrics for MDT discussions

A total of 145 cases of advanced ovarian cancer were discussed at the five centres throughout the course of the study and were analysed using the GO-MDT-MODe tool. Data were collected for the 12 fields across two domains in the tool; five fields relate to the information discussed, labelled “case discussion”, whilst the remaining seven fields relate to categories of clinician participating in the discussion, labelled “participation”. Summation of the fields thus yields two scores, one for each domain, with scores varying from 7 to 23 for case discussion and from 9 to 29 for participation, figure 2A.

Following three rounds of iteration, k-means clustering analysis revealed three stable clusters broadly identifying cases with minimal discussion/participation (low), intermediate discussion/participation (medium) and cases with high levels of discussion/participation (high), figure 2B.

Although all centres had cases in each of the three clusters the proportions differed significantly with centre A having a larger proportion of cases in "high" whilst centres B and C had larger proportions in "low" ($P<0.025$, chi squared), figure 2C.

Detailed analysis of discussion content and participation

We next undertook a detailed analysis of the discussions at each MDT by studying the individual components of each domain of the GO-MDT-MODe tool.

Within the case information domain, scores for "case history" were generally high whilst scores for "histology" were low, usually because no images were displayed. In contrast there were significant differences between the centres for the fields "markers" and "genetics" (ANOVA $p<0.05$), figure 3.

With regard to staff participation, in general there were universally high scores for "chair" and "radiology" participation, but low scores for nursing and junior doctor input. However, the most striking feature was the variable scores for "surgeon" input, which was high in centres A and D, intermediate in centres B and E but very low in centre C (ANOVA $p<0.05$), figure 4.

Correlation with clinical outcome

Finally, we extracted data for the five cancer alliances linked to the five centres in this study from the ovarian cancer audit feasibility pilot dataset [3], specifically the total percentage of patients having a major surgical resection as part of their primary management, whether this was before or after chemotherapy for each cancer alliance.

There was a weak correlation between surgeon's scores in the GO-MDT-MODe tool and rate of surgical resection (Spearmans $r=0.30$), predominantly driven by centre C, figure 5.

Discussion

Here we have carried out the first multi-centre study of ovarian cancer MDT decision-making. We have shown that significant differences exist, not only in the structure and format of meetings, but also in the input to each case. While the data are limited, we have also shown some associations between this and subsequent surgical practice.

Specifically, we demonstrate that a centre with a high caseload, and subsequently little time for discussion, had markedly reduced input from the surgical team and this associated with a lower rate of surgery for patients with ovarian cancer. This suggests that MDT behaviour may have a role in determining treatment pathways for patients, in contrast to previous studies which have suggested that MDTs have little role in determining patient outcome [9].

The use of the GO-MDT-MODe tool allows semi quantitative assessment of the quality of discussion taking place at an MDT meeting. The number of cases in this study allowed clustering and division of cases into low, medium and high giving a measure of how much input has been allocated to each case. This will be affected by many factors, including the complexity of the case, the engagement of the different professional groups, and the time allocated for the whole meeting. It is reasonable to assume that not all cases require detailed input from all members of the MDT. However, management of

ovarian cancer is complicated and therefore there would be an expectation that a large proportion of cases warrant a high-quality discussion. Equally, we would have expected to see a similar distribution of cases across the centres. However, whilst some centres in our study delivered a range of scores, spanning both low and high cases, others had a majority of cases in the low-quality discussion cluster.

While it is possible that the variation in discussion quality may be related to the number of times a patient is discussed prior to each treatment decision with some MDTs only discussing a patient once, once all relevant data are available, and others tending to discuss patients on multiple occasions, this does not explain the variation in surgical input seen between the centres.

This finding, that surgical input to discussions varied between centres, is of concern, particularly given the variable surgical practice seen in England [3]. Surgery is a complex treatment and cytoreductive surgery for ovarian cancer, whilst conferring clear benefits on patient outcome, can be associated with significant risks. Our findings suggest that some centres are not able to avail themselves of the MDT resource to optimise this decision making opportunity. Whilst the association seen here does not imply causation the effect of modifying MDT behaviour would be worthy of further study.

It is disappointing that nurse input was low in three centres studied here. Clinical nurse specialists bring a wealth of knowledge and experience to case discussions and are often in a strong position to provide advocacy for the patient. All centres should look at how they might incorporate nurse input into the meeting. A further concern was the universal finding that postgraduate doctors in training had virtually no input to case discussions at the MDTs observed. MDTs provide an invaluable resource for training, but it is crucial that trainee doctors have the time and encouragement to participate.

This study was only made possible by the movement to virtual MDTs that occurred as a result of the COVID pandemic. Previous studies have investigated different cancer MDTs located on the same sites [10] but, to our knowledge, this is the first study that has compared the same tumour type across multiple cancer centres. We have thus demonstrated that it is possible to benchmark MDT meetings and provide objective measurements of MDT performance that can be used to provide useful comparisons.

Our study reinforces the concept that MDTs can become ‘echo chambers’ of ingrained practice and steps should be taken to overcome this. Further studies are required to investigate whether encouraging clinicians involved with the care of ovarian cancer patients to attend other centre MDTs on a regular basis, to provide balance and perspective, improves quality of discussion and clinical management of patients. This is important, MDT meetings are expensive and use valuable resource [11], it is thus beholden on all members of the oncology team to ensure that best use is made of these meetings.

In summary, we have shown that MDT meetings are often time-pressured, have different behavioural standards, and thus discuss cases variably, which may be having an impact on case management. Further studies are required to investigate whether interventions in MDT behaviour will lead to change in clinical practice.

Rubric

Contributions to knowledge

- Here we show an association between MDT/tumour board behaviour and subsequent clinical practice. This has profound implications for overall survival of patients with advanced ovarian cancer.
- MDTs should examine their behaviour to ensure that they are structured to provide optimal conditions for discussion of all cases. This will ensure they do not become echo chambers of ingrained practice

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Paul Low, Phil McLaggen

Conflict of Interest Statement

CF received honoraria from Ethicon, GSK, Astra Zeneca/MSD, Tesaro, Clovis, Sequana and Roche, outside of the submitted work.

RJE received honoraria from GSK, Clovis and Roche, outside of the submitted work

No other authors declare any conflict of interest

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Tables

Table 1: Summary of centres' MDT performance

Centre	A	B	C	D	E
Number of meetings observed	3	4	3	3	4
Time allocated for each meeting (mins)	180	180	150	120	120
Actual meeting time (mean)(mins)	190.7	161.5	143.3	180.7	112.3
Total number of cases discussed	143	160	272	175	120
Number of advanced ovarian cancer cases discussed	30	34	33	27	21
Time for each discussion (mean) (mins)	4.04	4.03	1.58	3.14	3.82

Figures

Category	1	2	3	4	5
Case Information Domain					
Case history	No case information		Incomplete history		Comprehensive and complete history
Radiology	No imaging		Imaging described from a report		Imaging shown on screen
Pathology	No pathological information		Histopathology described from a report		Histological images or report shown on screen
Markers	No mention of cancer markers (eg CA125)		Brief mention of markers		In depth discussion of markers
Genetics	No mention of genetic or molecular testing				Both somatic and germline testing discussed
Participation Domain					
Chair	Impedes discussion		Neither impedes nor enhances discussion		Enhances discussion
Surgeons	No participation or impedes		Vague involvement		Specialty related involvement in discussion
Oncologists	No participation or impedes		Vague involvement		Specialty related involvement in discussion
Radiologists	No participation or impedes		Vague involvement		Specialty related involvement in discussion
Histopathologists	No participation or impedes		Vague involvement		Specialty related involvement in discussion
Specialist nurses	No participation or impedes		Vague involvement		Specialty related involvement in discussion
Junior doctors	No participation or impedes		Vague involvement		Specialty related involvement in discussion

Figure 1 – The GO-MDT-MODe tool

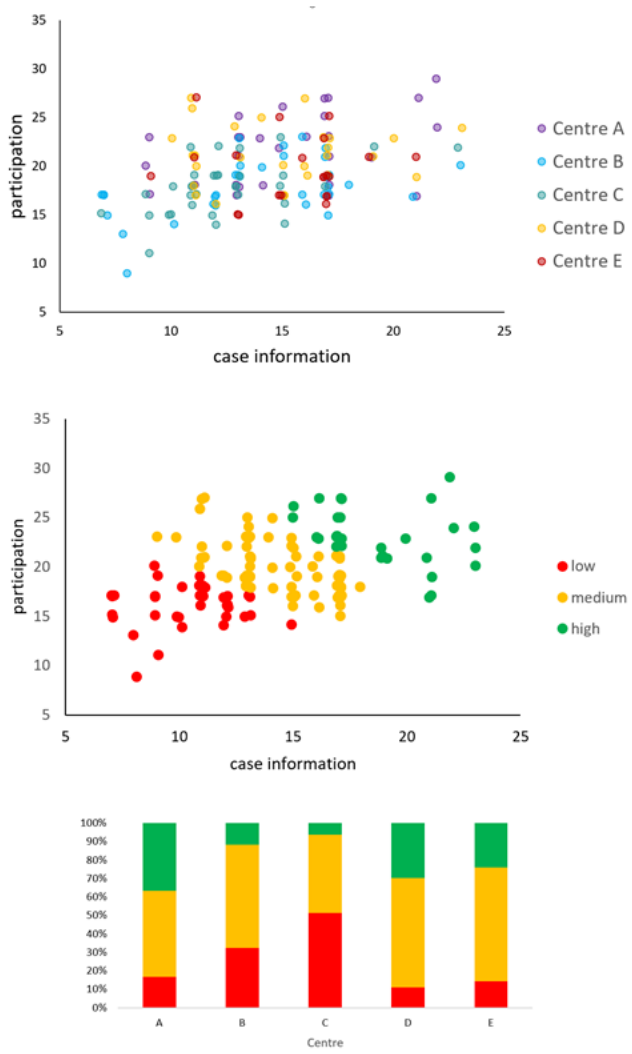

Figure 2: scatter plots showing distribution of GO-MDT-MODe scores for 145 cases of advanced ovarian cancer discussed at five gynae cancer centres. GO-MDT-MODe scores are distributed into two domains, case information (x axis) and participation(y axis). (A) showing distribution by centre and (B) by cluster following k-means clustering. Cases in green represent the most detailed discussions with high scores for both information and participation.

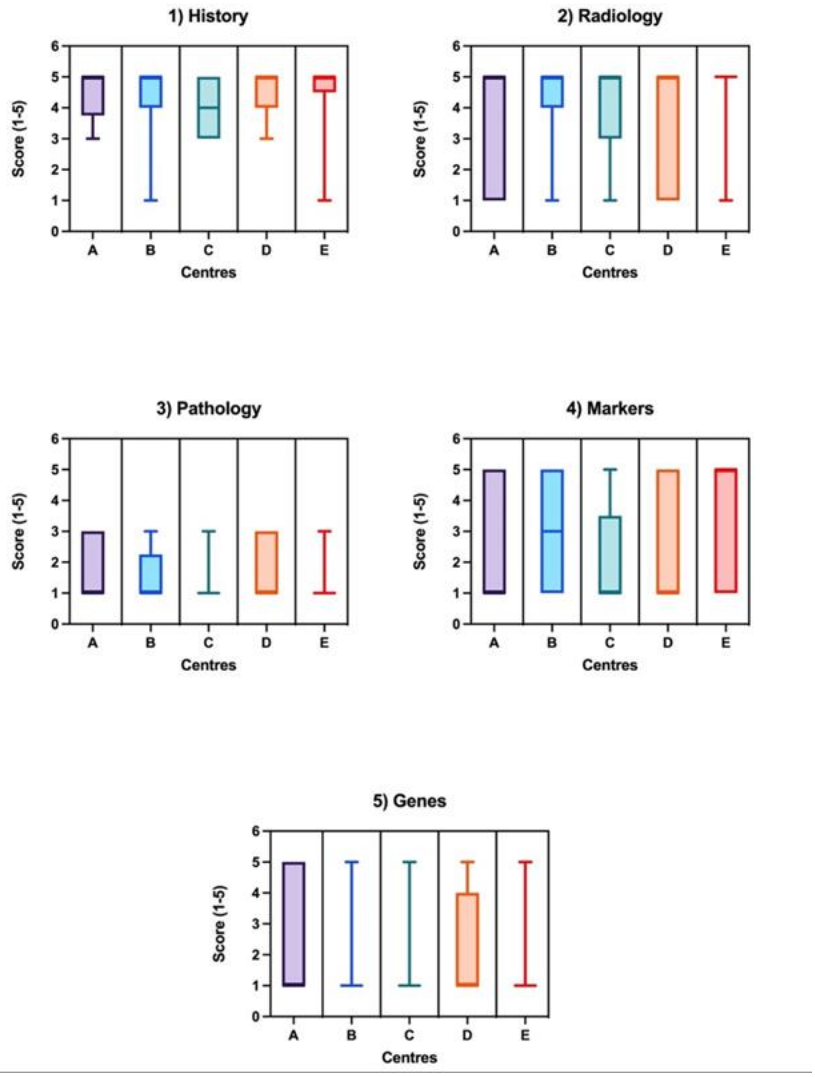

Figure 3: box and whisker plots for showing scores for the five fields in the case information domain of the GO-MDT-MODe tool for the five participating centres

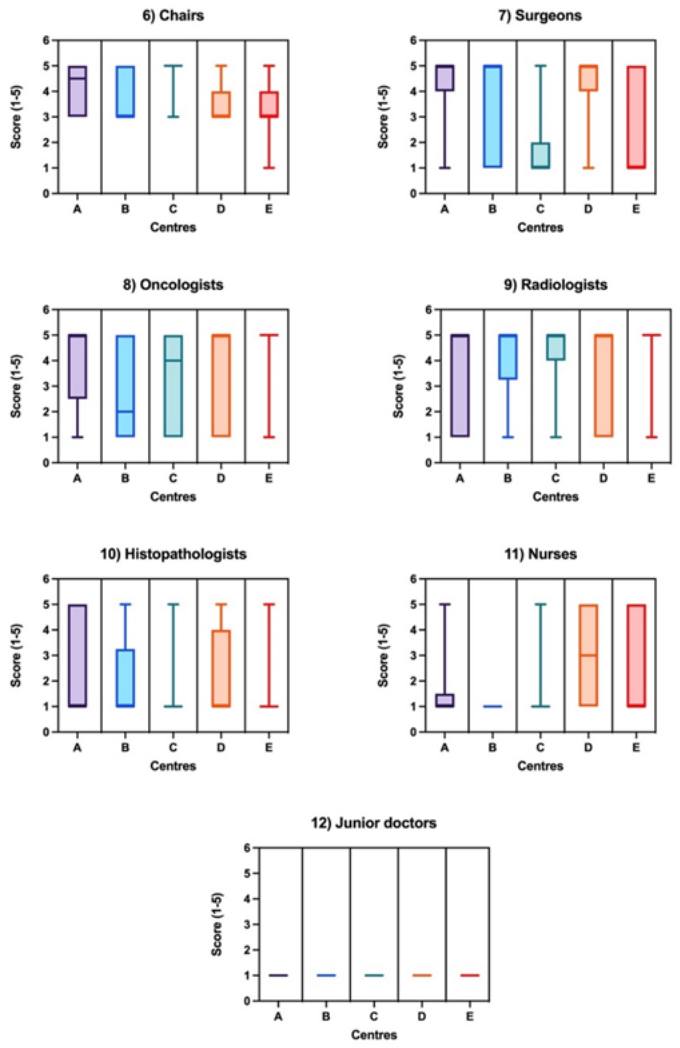

Figure 4: box and whisker plots for showing scores for the seven fields in participation domain of the GO-MDT-MODe tool for the seven professional groups

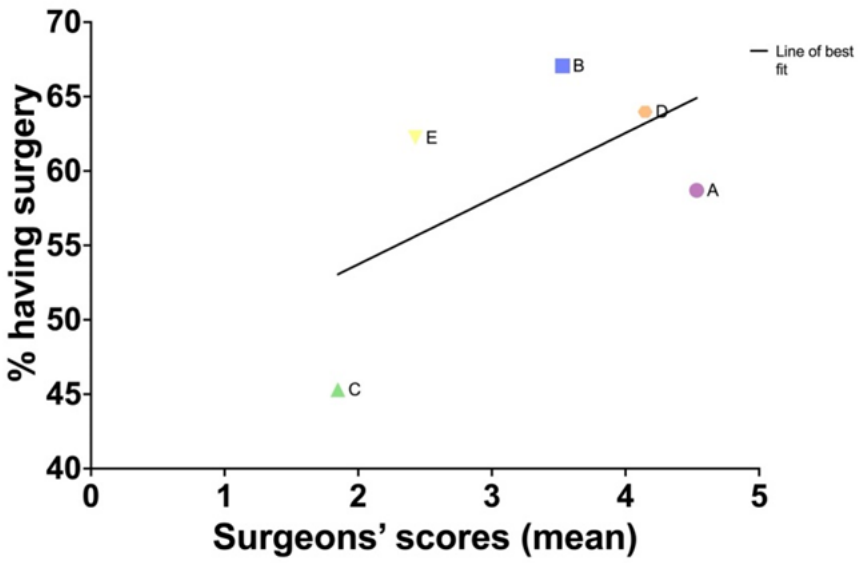

Figure 5 – correlation curve showing association between surgeons' scores at each centre MDT as measured using the GO-MDT-MODe tool and data taken from the OCAFP for relevant cancer centre for percentage of patients having surgery as part of their primary treatment

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