Oncology Research and Treatment

Research Article

Oncol Res Treat 2020;43:70–76
DOI: 10.1159/000504260

Received: July 24, 2019
Accepted: October 16, 2019
Published online: November 19, 2019

Decision-Making in Gynaecological Oncology Multidisciplinary Team Meetings: A Cross-Sectional, Observational Study of Ovarian Cancer Cases

Rebecca Scott[a] Amy Hawarden[a, b] Bryn Russell[a] Richard J. Edmondson[a, b]

[a]Division of Cancer Sciences, Faculty of Biology, Medicine and Health, University of Manchester, St Mary's Hospital, Manchester, UK; [b]Department of Obstetrics and Gynaecology, Manchester Academic Health Science Centre, St Mary's Hospital, Central Manchester NHS Foundation Trust, Manchester, UK

Keywords
Multidisciplinary working · Ovarian cancer · Exploratory factor analysis

Abstract
Introduction: Multidisciplinary team (MDT) meetings are widely used across the UK to provide expert decisions and improve cancer outcomes. However, little is known about the underlying mechanisms of MDT decision-making. We investigated how decisions are made regarding the management of advanced ovarian cancer in gynaecological oncology MDT meetings. ***Methods:*** A cross-sectional observational study was performed, focussing on 41/ 223 MDT case discussions across six hospitals. The validated MDT-MODe tool was adapted to increase relevance to gynaecological oncology. Case information and contributions from seven disciplines were rated on a five-point Likert scale. Spearman's correlation investigated relationships between factors and an exploratory factor analysis examined the underlying structure of MDT discussion. ***Results:*** Forty-one MDT decisions were made for patients with FIGO Stage III/IV ovarian cancer. MDT case discussions were structured by four factors: "Clinical Presentation," "Patient Factors," "Chair's Direction" and "Input from Other Specialties." Nurses were often quiet but facilitated discussion of patient factors. Junior doctors were not involved in MDT decision-making. ***Conclusions:*** The decision-making process in MDT meetings is driven by four underlying factors, the most significant of which represents patient history, tumour markers, images and radiologist input. Patient factors were underrepresented, and nurses should be empowered to overcome this.

Introduction

Multidisciplinary team (MDT) working was introduced into the NHS in the UK as a model of cancer care following the Calman-Hine report of 1995 [1]. It is defined as a "group of professionals from one or more clinical disciplines who together make decisions regarding recommended treatment of individual patients" [2], with the MDT meeting being seen as the pivotal decision-making tool. The rationale for MDT meetings is to provide a platform for specialist professionals to coordinate care and contribute their expertise towards complex decision-making. Patients managed by MDTs are more likely to receive appropriate staging [3], evidence-based management, and timely treatment [4]. Importantly, in colorectal [5], oesophageal [6], head and neck [7], breast [8] and lung cancer [9], MDT working has been associated with improved survival rates. Other putative benefits of MDT working include increased recruitment into clinical trials, greater educational opportunities for health professionals and improved job satisfaction of team members [10].

Richard J. Edmondson
Division of Cancer Sciences, University of Manchester
Manchester Academic Health Science Centre, St Mary's Hospital
Research Floor, Oxford Road, Manchester M13 9WL (UK)
E-Mail richard.edmondson@manchester.ac.uk

Although many hail MDTs as a success, they are not without significant cost. The average cost per new patient discussed at an MDT meeting is GBP 415 [11]. Gynaecological oncology has one of the highest costs of all cancer types, with an average of GBP 8,490 spent on gynaecological oncology MDT meetings every month per cancer centre [11]. In addition to significant funding needs, good leadership, adequate administrative support, clerical support and sufficient staff time are essential requirements for MDT working [10]. A report from the National Audit Office identified that pressures on staff time, travel across trusts, staff shortages, poor attendance and a widespread lack of administrative support are barriers to MDT efficacy [12]; significant resources are required to overcome these.

Despite their intensive use of NHS resources, there remains little understanding of how MDT meetings function, how information is utilised within them, and how MDT members interact to reach a decision. Understanding how MDTs reach clinical decisions is intrinsic to improving their function and ensuring good quality decisions are made. Previous studies have suggested that decisions tend to be clinically focussed rather than psychosocial [13] and that decisions about patients not known by the team members are less robust [14], but who participates and how decisions are made remains unclear for cases of ovarian cancer. To understand this, we therefore asked how decisions are made regarding the management of advanced ovarian cancer in gynaecological oncology MDT meetings. We hypothesised that decisions are made using detailed information covering a variety of patient and clinical factors, and all team members contribute and communicate effectively to reach an expert decision.

Methodology

Study Design

We carried out a cross-sectional observational study. We used the Gynae Oncology MDT meeting based at St Mary's Hospital, Manchester, UK, which pools clinicians from six NHS trusts, and covers a population of 1.8 million. The MDT meeting takes place on a weekly basis and comprises referring gynaecologists, subspecialty trained gynaecological oncologists, non-surgical oncologists, specialist nurses, radiologists, pathologists and support staff. Average duration of the meeting is 195 min with 50–60 patients being discussed each week.

Data were collected from four MDT meetings between 6th and 29th March 2019. All advanced ovarian cancer (FIGO stage III/IV) case discussions were included in the study.

During the MDT meetings, all cases were screened for relevance and then evaluated using the GO-MDT MODe described below. Observations were conducted in real time by an independent assessor (R.S.) who was not a member of the MDT. Efforts were made to limit potential biases by blinding the MDT to the role and aims of the assessor. In line with institutional policy, studies utilising data gathered as part of clinical care and anonymised before analysis do not require ethical approval.

MDT Decision-Making Tool Development

MDT-MODe is a validated tool for assessing MDT performance and quality of decision-making [15]. However, it lacks important criteria essential for making good quality decisions in gynaecological oncology. Therefore, a "gynae results" field was added to the tool, allowing us to evaluate how information regarding tumour markers, haematology results and genetics is utilised in MDT meetings. Additionally, the "team discussion" component of the MDT-MODe was modified to better reflect the team members within a gynaecological oncology MDT. The adapted tool was named the GO-MDT MODe (Gynaecological Oncology Multi-Disciplinary Team Metric Of DEcision making).

The original five-point Likert scale was maintained, 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 described 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.

Data Analyses

To visualise the distribution of GO-MDT MODe scores, box and whisker plots were produced using GraphPad Prism version 7 (GraphPad Software, San Diego, CA, USA). As the data were ordinal, median was used as an average.

Two-tailed Spearman's correlation was applied to analyse relationships between variables. Correlation was considered significant when $p < 0.05$.

Exploratory factor analysis (EFA) was performed to assess the underlying structure of decision-making. The variables included in the EFA were the individual items assessed in the GO-MDT MODe. Principle component factor analysis was applied. Factors were extracted based on the scree plot and an eigenvalue >1. Factors were rotated to simple structure via the oblique Promax algorithm with the Kappa parameter set to 4. Factor loadings were considered significant when >+0.5. Factors were labelled based on their shared qualities. Analyses were performed in SPSS® version 22.0 software (SPSS Inc., Chicago, IL, USA).

Data Checking and Quality

Observations were conducted in real time by an independent assessor (R.S.) who was not a member of the MDT; data were checked and validated following the meeting by a clinical member of the MDT (R.J.E.) for quality assurance.

Results

Description of the MDT Meetings

Meetings were organised by an MDT coordinator, who circulated the list of cases to be discussed prior to the meeting. The list included patient demographics, but not any clinical information. Meetings took place at a regular time every week during a designated 3-h period; this time was protected for consultants and nurses but not for junior doctors. Meetings were held in a dedicated meeting room, with approximately 12 regular members seated around a conference table. The meeting was connected via video link to up to six other hospital sites, who each

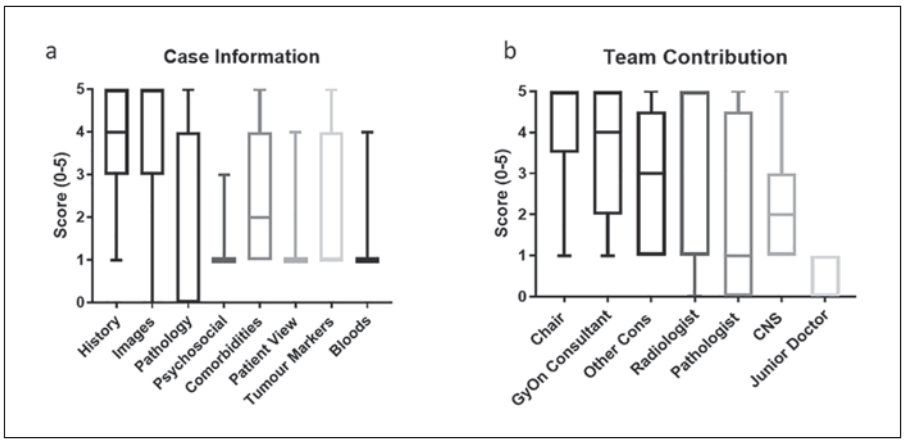

Fig. 1. Box and whisker plots showing GO-MDT MODe scores for case information (**a**) and team member contributions for each case discussed during MDT meetings (**b**).

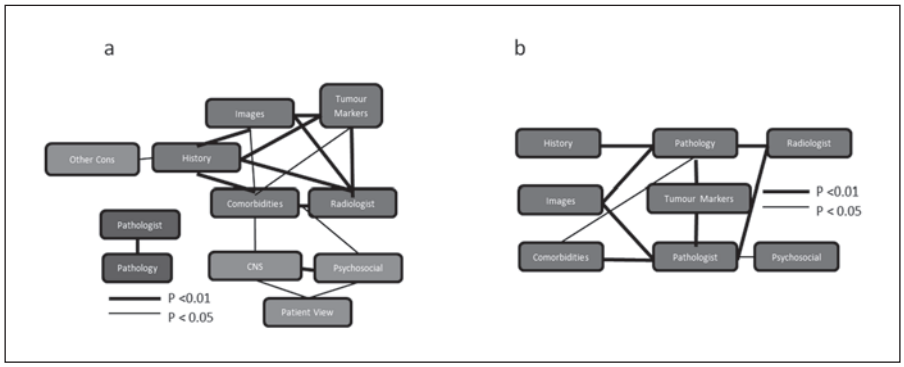

Fig. 2. Interactome showing significant positive Spearman's correlations (**a**) and significant negative Spearman's correlations (**b**) between discussion variables.

contributed between 1 and 4 team members to the discussion. The room was equipped with facilities to project and share radiological and pathological information. The meetings were chaired by a gynaecological oncology consultant, who also scribed. Attendance was recorded using a register.

The chair opened the meeting briefly before starting case discussions. In most cases, the chair or another consultant gynaecological oncologist presented the case. If relevant, the pathologist or radiologist would then present their findings, which formed the core of the discussion. Often the chair and one consultant gynaecological oncologist would then discuss treatment options, before moving on to the next case. Nurses rarely contributed at this stage, unless directly asked a question or if they required practical information to enable coordination of patient care, e.g. surgeon availability. Non-surgical oncologists were most likely to be consulted in cases of recurrent ovarian cancer or when a patient was due to receive adjuvant chemotherapy. Junior doctors, when present, did not contribute to the discussion. The MDT meeting closed with the last case.

A total of 223 cases were discussed over four weekly meetings, of which 41 cases met the study criteria for advanced ovarian cancer (FIGO III/IV). An average of 3.2 min was allocated per case.

MDT Discussion

The GO-MDT MODe tool was used to assess quality and depth of information utilised in discussion. There was significant variation between cases with basic clinical information being generally high quality; median scores for History and Images were 4 (good) and 5 (optimal), respectively. Pathological information was absent in most case discussions, often having been reviewed at a previous meeting, but when present, often scored 5 (optimal). Psychosocial aspects, patient views and blood results were often neglected, each sharing median score of 1 (no information shared). The maximum score for Psychosocial aspects was 3 (average) (Fig. 1a).

MDT discussion involved interaction between 7 main roles: Chair, Gynaecological Oncology Consultant, Other Consultant, Radiologist, Pathologist, Clinical Nurse Specialist (CNS) and Junior Doctor (Fig. 1b). The Chair's and Gynaecological Consultant's input were consistently high scoring, with median scores of 5 and 4 respectively. Radiologists frequently provided high quality contributions to the case discussion with a median score of 5 (optimal). On the other hand, Junior Doctors either were absent (score 0) or did not contribute (score 1). The CNS was not commonly involved in case discussion, but occasionally asked a question or offered a brief statement (score 2). The Pathologist was commonly present but

Table 1. Exploratory factor analysis structure matrix

	Factor			
	1	2	3	4
History	0.640*	0.026	0.316	0.487
Images	0.836*	0.209	0.121	0.419
Pathology	–0.902	–0.178	0.064	–0.246
Psychosocial	0.307	0.768*	0.124	0.354
Comorbidities	0.486	0.257	0.470	0.289
Patient View	0.091	0.625*	0.204	–0.030
Tumour Markers	0.696*	0.155	0.179	0.070
Bloods	0.151	0.006	0.301	0.167
Chair	0.015	0.182	0.783*	–0.342
GynOnc Cons	0.180	0.291	–0.026	–0.004
Other Cons	0.191	0.056	–0.038	0.772*
Radiologist	0.905*	0.261	0.285	0.456
Pathologist	–0.893	–0.222	–0.144	–0.220
CNS	0.116	0.732*	0.388	0.008
Junior Doctor	–0.066	–0.281	–0.737	–0.038

Four factors have been extracted. Extraction method: principal axis factoring. Rotation method: Promax with Kaiser normalization. * Factor loading significant when >0.5.

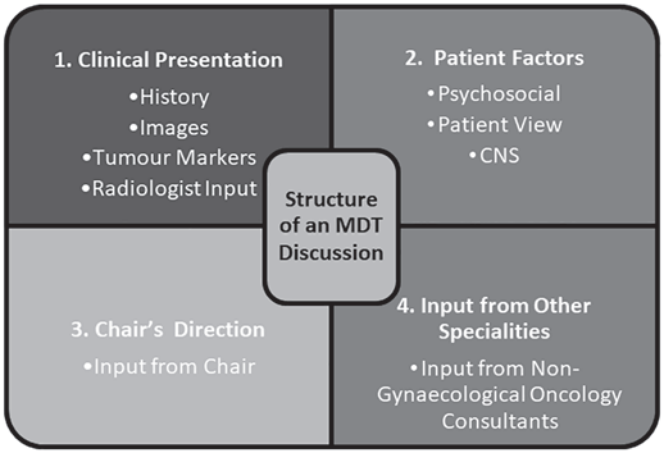

Fig. 3. Four key factors extracted from an exploratory factor analysis of MDT discussions.

only commented in a limited number of cases, resulting in a broad range of scores.

Relationships between Variables

Spearman's correlation of the data produced relationship matrices (Fig. 2).

Patient History, Images, Radiologist Input and Tumour Markers strongly correlated with each other ($p < 0.01$). CNS and Psychosocial factors strongly correlated ($p < 0.01$). Pathology and Pathologist Input also strongly correlated ($p < 0.01$), (Fig. 2a).

Weaker positive correlations were seen between Other Consultant Input and History ($p < 0.05$), CNS and Patient View ($p < 0.05$) and CNS and Comorbidities ($p < 0.05$).

Negative relationships between variables were also observed (Fig. 2b). Pathology had a negative correlation with Images, Radiologist Input, History and Tumour Markers ($p < 0.01$). Pathologist input also had a strong negative correlation with Images, Radiologist Input, Tumour Markers and Comorbidities ($p < 0.01$). Weaker inverse relationships were also seen between the Pathologist and Psychosocial aspects, and Pathology and Comorbidities ($p < 0.05$).

Structure of MDT Discussions

Based on the scree plot, eigenvalues and clinical considerations, four factors were extracted in the EFA (Table 1). These four factors explained 57% of total variance. Variable loadings for each factor are presented in Figure 3. The highest loading variables on the first factor were History (0.64), Images (0.836), Tumour Markers (0.696) and Radiologist Input (0.905); this factor was labelled "Clinical Presentation." The highest loading variables on the second factor were Psychosocial (0.768), Patient View (0.625) and CNS (0.732); this factor was labelled "Patient Factors." The highest loading variable on the third factor was the Chair's input (0.783); this was labelled "Chair's Direction." The highest loading variable on the final factor was Other Consultant (0.772), labelled "Other Speciality' Input."

Pathology and Pathologist input strongly negatively loaded in the "Clinical Presentation" Factor (–0.902 and –0.893, respectively). This corroborates the results of the Spearman's correlation, indicating there are two distinctly different discussions occurring; one discussing "Clinical Presentation" in detail, and another discussing pathology in detail. This is likely to represent the limited pathology available at first case presentation; a Spearman's correlation of treatment stage and Pathologist input supports this ($p = 0.085$), but more data are needed.

Discussion

In this study, we carried out a cross-sectional observational study focusing on a single clinical condition to investigate how decisions are made during MDT meetings, what factors are considered and how different team members contribute.

In our study, all MDT meetings involved a chair, and at least one gynaecological oncologist, radiologist, pathologist and cancer nurse specialist; key team members were required for an effective MDT [16]. Consultants from medical oncology, clinical oncology, gynaecology, and other specialties also contributed. Despite recommendations [16], an anaesthetist was not present for any of the MDT meetings observed; potentially a missed op-

portunity to discuss the operability of patients and advance decision-making. Further, the presence of junior team members also lacked. MDT meetings are an educational opportunity: radiologists demonstrated their findings to the team, high-quality discussions were held, and there were valuable multidisciplinary interactions. However, junior doctors were only present in 31% of meetings, and no students were present in any meetings. To improve Junior Doctor attendance, MDT meetings should be rostered and be listed as protected time.

Our study was limited by a relatively small size but benefits from the focus on just one disease type. Decision-making varies according to tumour type, and therefore focussing on just one disease type allows a more detailed focus [17].

Previous studies have attempted to analyse the "anatomy" of clinical decision-making. Using an EFA, Lamb et al. [15] produced four factors: "Holistic and Clinical inputs," "Radiology," "Pathology" and "Meeting Management." Our study indicated that our MDT meetings were composed of slightly different discussion types, producing themes of "Clinical Presentation," "Patient Factors," "Chair's Direction" and "Input from Other Specialties." "Clinical Presentation" accounted for the greatest proportion of total variance, suggesting that patient history, tumour markers, images and radiologist input are the most significant factors in MDT discussion. Our Spearman's correlation supported this, demonstrating significant correlation between these four clinical variables. It is noteworthy that patient comorbidities and blood results did not score highly and were not strongly weighted to key factors, indicating they are not frequently utilised in MDT decision-making. Pathology and Pathologist input appeared to form distinct and separate discussions. This is likely because pathological information normally only becomes available postoperatively in cases of advanced ovarian cancer and is not routinely discussed in cases of recurrent disease. This may change with an increasing reliance on histological confirmation of recurrent disease and an increasing use of genomic data in the management of patients with ovarian cancer but does currently suggest that discussions of patients with ovarian cancer are not holistic and are limited to specific themes at specific points in the patient pathway.

In 2011, the UK Government pushed for patients' needs, wishes and preferences to be placed at the centre of all clinical decisions, using the phrase "No decision about me without me." This provoked a series of advisory documents on shared decision-making, arguing that patients should be actively involved in MDT decision-making. "Patient Factors," relating to psychosocial aspects, patient view and CNS input, was found to be an important factor in our MDT case discussions. However, patient views and psychosocial issues were discussed in less than 20% cases. This corroborates previous work [10, 18], showing patient choice and co-morbidity to be peripheral to clinical decision-making. This is important as previous studies have found that 10–15% MDT recommendations are not implemented as the MDT has not considered patient factors [19, 20]. When patient views and psychosocial issues were discussed, this information was provided by a nurse – something noted in previous research [16]. Personal knowledge of the patient is also important to improve quality of discussion [12, 14]. To improve the discussion of patient factors, some MDTs invite patients to be present during the discussion of their case in the MDT meeting. Proposed benefits of patient involvement in MDT meetings include better adherence and more appropriate treatment decisions, but there are concerns regarding patient confidentiality and the sharing of complex information. Instead, we advocate the use of a validated checklist, such as the MDT-QuIC [21], to empower nurses and encourage MDT discussion of patient comorbidities, psychosocial factors and patient views.

Conclusion

In summary our results indicate that MDT case discussions are structured by four components: "Clinical Presentation," "Patient Factors," "Chair's Direction" and "Input from Other Specialties." The "Clinical Presentation" is the most significant factor, representing patient history, tumour markers, images and radiologist input. A distinct, pathology-centred group of decisions is also noted. Although recognised as a key component of case discussions, patient factors are often underrepresented. Further research utilising a confirmatory factor analysis, multiple assessors and larger case numbers should be performed to investigate whether the four determined factors are truly significant and if they are relevant to other disease types. Additionally, future work could investigate how these factors influence different decision outcomes.

Acknowledgement

Members of the Gynae MDT.

Statement of Ethics

This study involved an analysis of process and no patient identifiable data were collected. Ethics approval was therefore not required for this study.

Disclosure Statement

All authors declare that they have no conflicts of interest.

Funding Sources

No external funding was used for this study.

Author Contributions

R.S. and R.J.E. devised the study, R.S. and A.H. collected data, R.S., A.H. and B.R. carried out the analysis and R.S. and R.J.E. wrote the manuscript. All authors approved the final submitted manuscript.

References

1 Haward RA. The Calman-Hine report: a personal retrospective on the UK's first comprehensive policy on cancer services. Lancet Oncol. 2006 Apr;7(4):336–46.
2 England N. Supporting Information: Multidisciplinary Team. NHS Business Definitions (n.d.). 2019 Sept. Available from: https://www.datadictionary.nhs.uk/data_dictionary/nhs_business_definitions/m/multidisciplinary_team_de.asp?shownav=1
3 Pillay B, Wootten AC, Crowe H, Corcoran N, Tran B, Bowden P, et al. The impact of multidisciplinary team meetings on patient assessment, management and outcomes in oncology settings: A systematic review of the literature. Cancer Treat Rev. 2016 Jan;42:56–72.
4 Taylor C, Munro AJ, Glynne-Jones R, Griffith C, Trevatt P, Richards M, et al. Multidisciplinary team working in cancer: what is the evidence? BMJ. 2010 Mar;340:c951.
5 Morris E, Haward RA, Gilthorpe MS, Craigs C, Forman D. The impact of the Calman-Hine report on the processes and outcomes of care for Yorkshire's colorectal cancer patients. Br J Cancer. 2006 Oct;95(8):979–85.
6 Stephens MR, Lewis WG, Brewster AE, Lord I, Blackshaw GR, Hodzovic I, et al. Multidisciplinary team management is associated with improved outcomes after surgery for esophageal cancer. Dis Esophagus. 2006;19(3):164–71.
7 Birchall M, Bailey D, King P; South West Cancer Intelligence Service Head and Neck Tumour Panel. Effect of process standards on survival of patients with head and neck cancer in the south and west of England. Br J Cancer. 2004 Oct;91(8):1477–81.
8 Kesson EM, Allardice GM, George WD, Burns HJ, Morrison DS. Effects of multidisciplinary team working on breast cancer survival: retrospective, comparative, interventional cohort study of 13 722 women. BMJ. 2012 Apr;344:e2718.
9 Bydder S, Nowak A, Marion K, Phillips M, Atun R. The impact of case discussion at a multidisciplinary team meeting on the treatment and survival of patients with inoperable non-small cell lung cancer. Intern Med J. 2009 Dec;39(12):838–41.
10 Fleissig A, Jenkins V, Catt S, Fallowfield L. Multidisciplinary teams in cancer care: are they effective in the UK? Lancet Oncol. 2006 Nov;7(11):935–43.
11 De Ieso PB, Coward JI, Letsa I, Schick U, Nandhabalan M, Frentzas S, et al. A study of the decision outcomes and financial costs of multidisciplinary team meetings (MDMs) in oncology. Br J Cancer. 2013 Oct;109(9):2295–300.
12 National Audit Office. Tackling cancer in England: saving more lives. 2019 Sept. Available from: https://www.nao.org.uk/wp-content/uploads/2004/03/0304364.pdf
13 Lanceley A, Savage J, Menon U, Jacobs I. Influences on multidisciplinary team decision-making. Int J Gynecol Cancer. 2008 Mar-Apr;18(2):215–22.
14 Hahlweg P, Hoffmann J, Härter M, Frosch DL, Elwyn G, Scholl I. In Absentia: An Exploratory Study of How Patients Are Considered in Multidisciplinary Cancer Team Meetings. PLoS One. 2015 Oct;10(10):e0139921.
15 Lamb BW, Wong HW, Vincent C, Green JS, Sevdalis N. Teamwork and team performance in multidisciplinary cancer teams: development and evaluation of an observational assessment tool. BMJ Qual Saf. 2011 Oct;20(10):849–56.
16 Soukup T, Lamb BW, Arora S, Darzi A, Sevdalis N, Green JS. Successful strategies in implementing a multidisciplinary team working in the care of patients with cancer: an overview and synthesis of the available literature. J Multidiscip Healthc. 2018 Jan;11:49–61.
17 Hahlweg P, Didi S, Kriston L, Härter M, Nestoriuc Y, Scholl I. Process quality of decision-making in multidisciplinary cancer team meetings: a structured observational study. BMC Cancer. 2017 Nov;17(1):772.
18 Kidger J, Murdoch J, Donovan JL, Blazeby JM. Clinical decision-making in a multidisciplinary gynaecological cancer team: a qualitative study. BJOG. 2009 Mar;116(4):511–7.
19 Wood JJ, Metcalfe C, Paes A, Sylvester P, Durdey P, Thomas MG, et al. An evaluation of treatment decisions at a colorectal cancer multi-disciplinary team. Colorectal Dis. 2008 Oct;10(8):769–72.
20 Blazeby JM, Wilson L, Metcalfe C, Nicklin J, English R, Donovan JL. Analysis of clinical decision-making in multi-disciplinary cancer teams. Ann Oncol. 2006 Mar;17(3):457–60.
21 Lamb BW, Sevdalis N, Vincent C, Green JS. Development and evaluation of a checklist to support decision making in cancer multidisciplinary team meetings: MDT-QuIC. Ann Surg Oncol. 2012 Jun;19(6):1759–65.