Are Criteria Commonly Used in the Benefit Assessment of Drugs Also Applicable to Medical Devices? A Systematic Literature Review

PMD120

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OBJECTIVE

- Medical devices are characterized as products of medical purpose, assigned for application in humans and which do not have a main pharmacological, immunological or metabolic effect (Bundesministerium für Gesundheit, 2016).
- Since 2016, new medical devices of risk classes IIb/III have to undergo benefit assessment according to § 137h SGB V to be included in the German system of Diagnosis Related Groups (G-DRG).
- Thus, the objective of our research was to investigate whether evidence criteria of drug benefit assessment are also applicable to medical devices of risk classes IIb/III and, if this is the case, to which extend.

METHODS

- We performed a systematic literature research in Medline (ME60) and Cochrane Central Register of Controlled Trials (CCTR93) databases to identify randomized, controlled trials (RCTs) published between January 2015 and May 2016, using relevant MeSH and controlled terms as well as a validated filter for RCTs (Wong et al., 2006).
- Since a comprehensive and unrestricted search for medical devices of risk classes IIb/III is neither practical nor feasible, we limited our search to representatives of those risk classes. Therefore, catheters, prostheses and implants as well as surgical equipment, considering specific procedures, were chosen.
- After elimination of duplicates, titles and abstracts of the remaining publications were screened by using defined inclusion criteria (Table 1) and were additionally selected for high-risk classes.
- Finally, hits were categorized by indication, study size, duration and blinding.

Table 1. Inclusion criteria for the evaluation of studies

Criterion	Inclusion criteria	Exclusion criteria	Justification
Intervention	Medical device of high-risk class IIb/III	Intervention differs	Target technology of benefit assessment
Endpoints	Mortality, morbidity, quality of life and safety	No endpoints, which could be used for the assessment of mortality, morbidity, quality of life or safety	According to MPG
Study type	RCT	Studies that are non-randomized, non-controlled or non-clinical	According to MPG
Language	German, English	Language differs	-
Type of publication	Publication provides sufficient information for the evaluation of the methodology/results (e. g. full publication)	Publication does not provide sufficient information for the evaluation of the methodology/results (e. g. Review article, poster abstract)	Adequate data availability for methodology/results

MPG: The Act of Medical Devices, RCT: randomized, controlled trial

RESULTS

- We identified 2,320 hits, with 1,917 publications (CCTR93: 794, ME60: 1,123) published in 2015 and 403 publications (CCTR93: 69, ME60: 334) published in 2016, respectively (Figure 1).
- After screening of titles and abstracts, 1,745 publications could be excluded. Of the remaining 575 hits, more than 50% were excluded because the criterion of high-risk class was not met.
- Thus, in total we identified 216 hits describing RCTs of medical devices of high-risk class IIb/III, presenting data on: (a) catheters (71 hits); and (b) prostheses (145 hits).

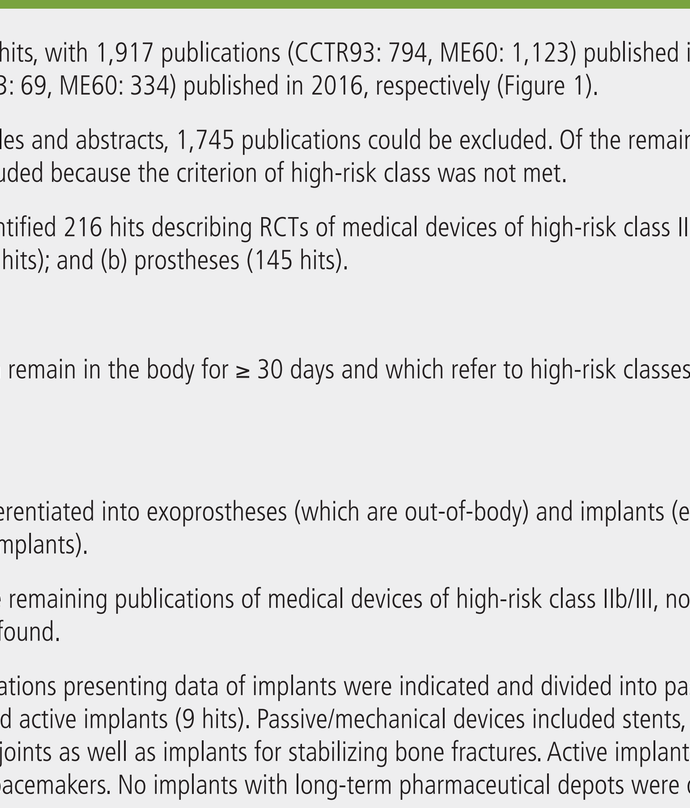
(a) Catheters

- Only catheters which remain in the body for ≥ 30 days and which refer to high-risk classes were considered for further analysis.

(b) Prostheses

- Prostheses were differentiated into exoprostheses (which are out-of-body) and implants (endoprostheses, which are tissue-enclosed implants).
- After selection of the remaining publications of medical devices of high-risk class IIb/III, no publication addressing exoprostheses were found.
- However, 145 publications presenting data of implants were indicated and divided into passive/mechanical devices (136 hits) and active implants (9 hits). Passive/mechanical devices included stents, dental implants, artificial hip or knee joints as well as implants for stabilizing bone fractures. Active implants, in turn, were cochlear implants or cardiac pacemakers. No implants with long-term pharmaceutical depots were detected (Figure 2).

Figure 1. Flowchart of bibliographic literature research – search for RCTs with medical devices to be evaluated



Study size

- Compared to RCTs in drugs, ≥ 50% of the identified studies were relatively small (≤ 100 patients). Of these, 27.3% included < 50 participants, whereas 28.7% of the publications included a study size of 50–100 participants (Figure 2).
- In addition, approximately 34% of the remaining studies used a sample size of 101–500 participants, while 7% included > 500 participants.
- For 3.2% of the publications, no information about study size was given.
- By comparing the average (median) study sizes of publications regarding implants and catheters, data revealed similar study sizes (for implants: 272 patients [median: 71]; for catheters: 303 patients [median: 100]).

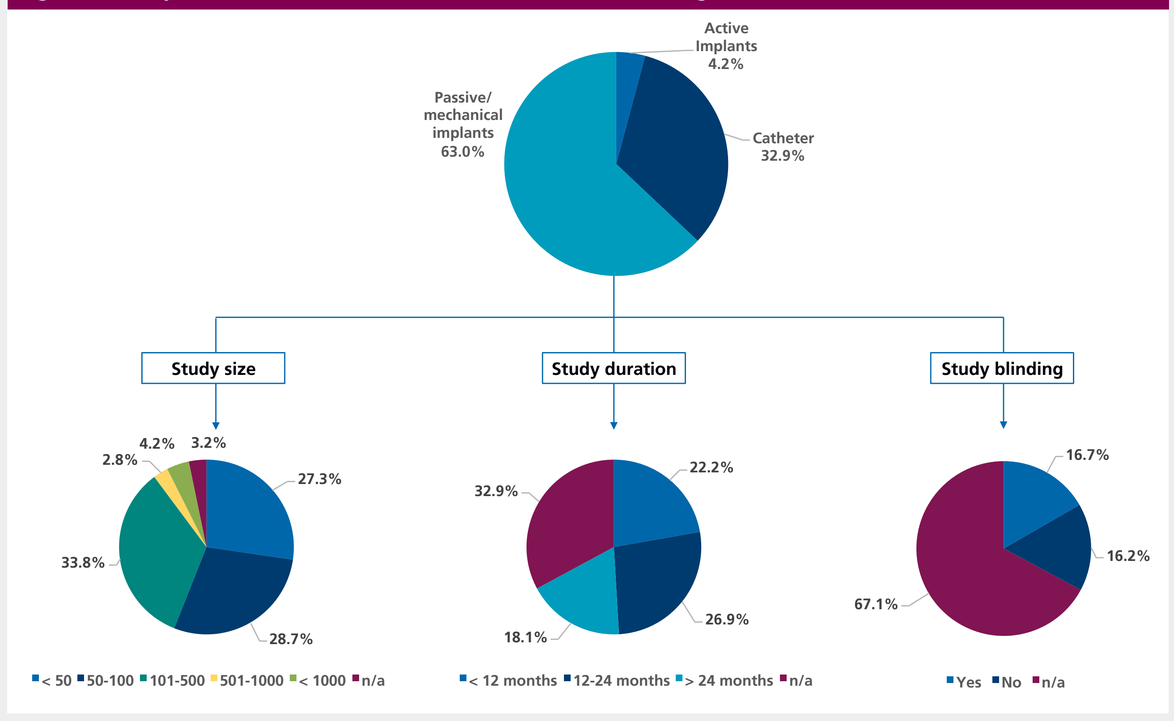
Study duration

- According to drug benefit assessment criteria, we assumed that studies of medical devices of high-risk class should also have a study duration of ≥ 12 months.
- The data reveal that nearly one quarter of the screened studies (22.2%) were shorter than 12 months, whereas 26.9% and 18.1% of the studies had a duration of 12–24 months and of ≥ 24 months, respectively. In 32.9% of the publications, however, no information on the duration of the study was given.

Study blinding

- In 32.9% of the publications, information on blinding was available (16.7% blinded and 16.2% not blinded).
- In 67.1% of the screened publications, no information on blinding was given.

Figure 2. Study characteristics of identified medical devices of high-risk class IIb/III



DISCUSSION & CONCLUSION

- Although publications were indexed as RCTs in the literature databases, 28% (483 hits) of the excluded hits/ publications were neither randomized nor controlled.
- Compared to RCTs in drugs, study size was relatively small (< 100) and methodological aspects differed substantially from IQWiG-accepted approaches.
- Strictly applying criteria of benefit assessment of drugs, e. g. study duration, randomization and blinding, to the benefit assessment of medical devices does not seem to be feasible. Medical devices of high-risk class IIb/III would most likely be rejected in a benefit assessment. The diffusion of innovative medical devices into the health system is therefore likely to be hindered. In consequence, from the individual perspective, a loss of an added medical benefit and, from the social perspective, a loss in welfare cannot be excluded.
- Special characteristics of medical devices might at least partly explain the differences in the methodological quality of studies of medical devices compared to studies of drugs.
- Therefore, from an individual as well as from the health-policy perspective, and in order to capture the added medical benefit to innovative medical devices in a comprehensive way, methodological adaptations are advisable.

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