Current status of the use of medical robots in Germany, Austria and Switzerland

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Abstract. The high expectations on medical robots in the beginning of the 90's were not achieved by the current systems so far, because of the high costs, limited flexibility and limited range of applications. Particularly in Germany there seems to be low use of telemanipulation systems in clinical routine. We were interested in the reality of the current status of the use of medical robots in Germany, Austria and Switzerland. For that, we designed a short questionnaire sent by e-mail to about 980 surgical hospitals, asking for the use of medical robots, the kind of robots and pros and cons of the use. The results of the survey will be presented.

1 Introduction

Contrary to optimistic prognoses mechatronic systems still play a minor role in surgery. Nevertheless, after a few years of depression there seems to be a growing interst on the area of robotic surgery. The aim of this study was to assess realitiy of the current use of medical robots in Germany, Austria and Switzerland.

2 Material and Methods

A questionnaire was designed, asking for the use of robotic systems in experimental and clinical routine, in the past or actually. In case of not using such a device or using it not any longer, we asked for the detailed reasons. If robotic systems were in use, we asked for the type and the indications and kind of interventions it is used for. Further we asked for a precise description of the pros and cons of the used systems. Finally it was collected if there are any activities in research.

The questionnaires were sent by e-mail to about 980 hospitals in Germany, Austria and Switzerland.

3 Results

89 of the 980 questionnaires were returned. In n = 67 cases there was no use of robotic systems (75,3%). In n = 6 cases (6,7%) an experimental use of robotic systems was reported, using the AESOP and daVinci system in one case respectively, or using a self-made prototype in the other four cases. N = 19 (21,3%) hospitals reported the use

of robotic systems in clinical routine, using the AESOP system in n = 7 (7,9%) cases, the daVinci system in n = 7 (7,9%) cases and n = 5 (5,6%) cases with use of other systems. The use of robotic devices was discontinued in n = 6 cases (6,7%), concerning the AESOP system in n = 5 cases (5,6%) and the Robodoc system in n = 1 case (1,1%) (Fig. 1). The average use per year was 20 cases with a range from 2 to 74.

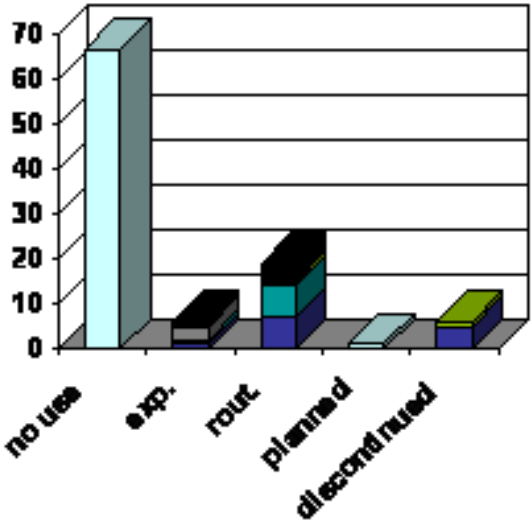

Fig. 1: The use of robotic systems in Germany, Austria and Switzerland

As reason for no application or discontinued application of robotic systems first of all the high costs were mentioned in 50 % of all answers (Fig. 2), followed by lack of true indications in 41 %. The education of untrained surgeons is the reason of about 13 % of the hospitals. 8 % of the hospitals can't see any benefit in the outcome of the operations using a robotic system and respectively 4 % mentioned the limited range of application and the reserved public opinion as criteria.

Those who use camera-guiding systems like AESOP or Endoassist, mentioned as positve arguments the stable visual field, the lack of exhaustion an the reduction of staff. They criticize the uncomfortable handling, the high operating costs and the prolonged operating time.

The users of master-slave systems like daVinci point out as advantages the 3D-visualisation, the precise movements and the ergonomic position of the surgeon at the console. On the other hand they criticize the high purchase and current costs, the long time for installation, the huge dimensions and weight and the reduced operating field.

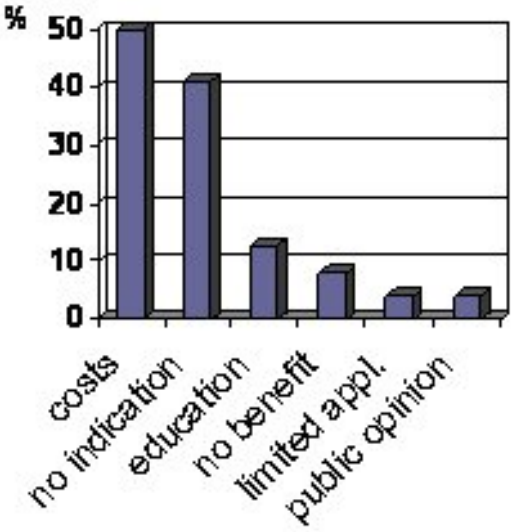

Fig. 2: Reason for no application or discontinued application of robotic systems

4 Conclusion

Telemanipulation systems are used in all surgical sections. However, clinical importance is low since no “killer applications” exists.

For surgical purposes a system is preferable, which can assist the surgeon in several different ways, which does not obstruct visibility in the operation-field which is as compact as possible, which is easily mountable and removable in clinical routine and can furthermore be controlled intuitively by the surgeon.