



Review

Day case appendectomy in adults: A review[☆]C. Cosse^{a, b}, C. Sabbagh^{a, b}, G. Grelpois^{a, c}, O. Brehant^a, J.M. Regimbeau^{a, c, *}^a Department of Digestive and Oncological Surgery, North Hospital, Amiens University Medical Centre and Jules Verne University of Picardie, Place Victor Pauchet, F-80054 Amiens Cedex 01, France^b INSERM U1088, Jules Verne University of Picardie, Amiens, France^c EA4294, Jules Verne University of Picardie, Amiens, France

HIGHLIGHTS

- We reported the feasibility of Day Case Appendectomy (DCA).
- The unplanned overnight admissions and unexpected consultations are low.
- Hospital readmissions and patient reoperation were lower than 5%.
- The morbidity of DCA is lower than 15%.
- The patient satisfaction is higher than 90%.

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ABSTRACT

Background: Day-case appendectomy (DCA) for acute appendicitis has been suggested as a valuable alternative to traditional appendectomy but many surgeons are reluctant to apply this technique in adults. The aim of the present review is to discuss the feasibility of DCA in adults.

Methods: Three reviewers independently searched the Pubmed and Embase databases for articles on DCA. They then considered the criteria applicable to the surgery, day-case surgery, time taken for patients to resume normal activities, mean time to resumption of work and patient satisfaction.

Results: Between 1993 and 2012, 13 studies (with retrospective ($n = 8$), prospective ($n = 4$) or case-control study ($n = 1$) designs) dealt with DCA. A total of 1152 adults underwent DCA. 312 patients (27.08%) were discharged within 12 h, 614 (53.29%) within 24 h and 242 (21.01%) within 72 h.

Conclusion: The few data reported in 13 studies, suggest that DCA may be feasible. However prospective studies are needed before DCA can be recommended.

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1. Introduction

Appendicitis is one of the most frequent medical emergencies, with around 120,000 case per year in France and over 40,000 per year in the UK [1,2]. This incidence peaks in the 20–30 age class [3] and the lifetime rate is between 6% and 10% [4,5]. In France, the

median length of stay is around 3 days in case of traditional surgery. Open appendectomy was first described by George Thomas Martin in 1887 and by Charles McBurney in 1889. Laparoscopic appendectomy was introduced by Kurt Semm in 1983 and now accounts for the majority of operations in this condition.

In France, ambulatory surgery (AS) is defined as an outpatient treatment mode in which the length of hospital stay (LOS) is shorter than 12 h without an overnight hospitalization. Ambulatory surgery was designated as a French national healthcare priority in 2010. Three French learned societies (the French Society of Digestive Surgery (SFCD), the Association of Hepatobiliary Surgery and Transplantation (ACHBT) and the French Association for Ambulatory Surgery (AFCA)) have jointly proposed evidence-based guidelines for AS [6]. These guidelines can be applied to elective surgical operations such as fundoplication in gastro-oesophageal reflux disease [7,8], laparoscopic adjustable gastric banding and proctology

Abbreviations used: DCA, day-case appendectomy; UOA, unplanned overnight admission; LOS, length of stay; DCS, day-case surgery; RCT, randomized controlled trial; AS, ambulatory surgery; AA, ambulatory appendectomy.

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surgery and cholecystectomy for biliary colic [9–12]. Even though appendectomy is associated with low morbidity and mortality, the learned societies nevertheless state that the feasibility of ambulatory surgery remains to be proven because of the lack of intention-to-treat studies and differences in the definition of AS.

To circumvent the constraints and difficulties of ambulatory surgery, day-case surgery (DCS) has been suggested as an alternative. In DCS, the LOS is rather than 24 h and again does not involve overnight hospitalization. This new treatment mode has been applied to a number of pathologies including appendectomy. In deed, day-case appendectomy (DCA) has been described as safe and effective in children [13–15]. However the available data on adults are not pertinent and reproducible enough to enable a consensus to be formed. The aim of the present review is to discuss the feasibility of DCA in adults.

2. Methods

2.1. Definitions

Is considered as an “ambulatory surgery” (AS) a procedure in which the hospital LOS is shorter than 12 h whereas a “day case surgery” (DCS) is characterized by a hospital LOS shorter than 24 h without an overnight hospitalization. Despite this difference, AS and DCS correspond to variations on the theme of “outpatients surgery”.

The unplanned overnight admission rate represents the proportion of patients who are discharged more than 24 h after the surgical procedure (in case of DCS) or more than 12 h after the surgery (in case of AS) and are thus hospitalized for at least one night. The unexpected consultation rate reflects the number of AS or DCS patients attending the emergency department for a post-operative problem. The hospital readmission rate is defined as the number of patients who are discharged from hospital after AS or DCS but are subsequently readmitted. Lastly, the reoperation rate reflects the proportion of patients who are operated on after their post-AS/DCS discharge. The latter four items are defined as quality indicators for AS by the International Association for Ambulatory Surgery.

2.2. Search strategy and selection criteria

Three reviewers independently searched the Pubmed and Embase databases for prospective, retrospective or case-control articles on DCA for appendicitis in adults published between 1993 and 2012. The search terms were “ambulatory surgery”, “day-case surgery”, “outpatient surgery”, “same-day surgery”, “appendicitis” and “appendectomy”. Even though the definitions of AS and DCS differ somewhat, both were selected because they correspond to outpatient settings. Only full, original articles written in English were selected. In each selected article, the references were checked for studies not identified or listed in PubMed and Embase.

2.3. Data extraction and analysis

The three reviewers extracted the following data from each selected study: first author, date, type of study, number of patients included and the inclusion and exclusion criteria. The data were separated into subgroups: data related to appendicitis and the surgical procedure (the severity of the appendicitis, surgical access, the rate of conversion to open surgery and the mean operating time), those related to DCS (unplanned overnight hospitalizations; unexpected consultations; readmission; reoperation and the mean LOS); those related to postoperative outcomes (causes of post-operative mortality and morbidity) and, lastly those related to the

patients’ activities (time taken for patients to resume normal activities and mean time to resumption of work). Patient satisfaction was also recorded. All extracted data were recorded in a table.

2.4. Assessment of the quality of selected publications

The methodological quality of the clinical trials was independently evaluated by the three reviewers according to criteria published by the Centre for Evidence-Based Medicine in Oxford [16] level 1a, systematic reviews and meta-analyses of randomized, controlled trials (RCTs); level 1b, individual RCTs; level 2a, systematic reviews and meta-analyses of cohort studies; level 2b, individual cohort studies, including low-quality RCTs; level 3a, systematic reviews of case-control studies; level 3b, individual case-control studies; level 4, case series (either prospective or retrospective); level 5, expert opinion.

Any disagreements between the three reviewers on data quality were resolved by consensus.

3. Results

3.1. Identified and selected publications

Two hundred and fifty-nine references were considered as eligible for review. Only 13 (5.02%) turned out to be relevant, English-language, full-text, original articles on appendicitis in adults. Eight of these studies were retrospective (level 3b) [17–24], four were prospective (level 2b) [25–28] and one was a case-control study (level 4) [29]. No randomized trials or meta-analyses were in Pubmed and Embase searches. Only one comparative study was found [20] which prevented us from performing a meta-analysis. The review’s flowchart is shown in Fig. 1.

3.2. Number of patients enrolled

One thousand three hundred and eighty-one adults with either acute or perforated appendicitis were included in the 13 selected studies. A total of 1152 adult patients (83.42%) underwent DCS. Ambulatory surgery for acute appendicitis was reported in two European retrospective studies [21,29], two American retrospective studies [23,24] and one prospective study [28], in which a total of 312 patients were discharged during the first 12 h (27.08% of all the adults included in the total reviewed series). Day-case appendectomy was mainly found in North American series (with seven retrospective studies [17–20,22–24] and two prospective studies [28,25]). In all, 614 patients were discharged the same day and were thus classified as having undergone DCS (53.29% of all the adults included in the total reviewed series). The last three selected publications dealing with “early discharge surgery” [23,26,27] included 242 patients (21.01% of all cases of appendicitis) discharged within 46–57 h of surgery.

3.3. Inclusion criteria

The most frequent inclusion criteria for DCA were as follows: a clinical diagnosis of acute appendicitis; age under 65; an adult carer available to monitor the patient for the first 24 h post-discharge; place of residence within 1 h of a hospital; active telephone line available; ASA grade I or II and good patient compliance.

3.4. Exclusion criteria

The main exclusion criteria were as follows: complicated appendicitis; pregnancy or breastfeeding; unstable vital signs or fever; pain uncontrolled by oral analgesics; objective signs of

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