ASHCOM™ Shoulder System and Its Related Instruments

A Multicenter, Prospective, Non-Controlled Post Market Clinical Follow-up Study

Protocol number: CME2017-67E
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1 STUDY SYNOPSIS

Complete Protocol Title	ASHCOM™ Shoulder System and Its Related Instruments A Multicenter, Prospective, Non-Controlled Post Market Clinical Follow-up Study
Protocol Number	CME2017-67E
Short Protocol Title	ASHCOM™ Shoulder System and Its Related Instruments
Sponsor	Zimmer GmbH, Zählerweg 4, 6300 Zug, Switzerland
Manufacturer	Zimmer Switzerland Manufacturing GmbH, Sulzerallee 8, 8404 Winterthur, Switzerland
Study Device(s)	Anaverse™ Glenoid System
Study Objectives/Endpoints	The objectives of this study are to confirm safety, performance and clinical benefits of the ASHCOM Shoulder System and its related instruments by analysis of standard scoring systems, radiographs and adverse event records. The primary endpoint is defined by the survival of the implant at 10 years which is based on removal or intended removal of the prosthesis and will be determined using Kaplan Meier method. The safety of the system will be assessed by monitoring the frequency and incidence of adverse events. The secondary endpoint of this study is defined by the performance and clinical benefits of the ASHCOM Shoulder System at 5 years, which is assessed by the Constant and Murley score. Assessments of the overall pain, functional performance, survival, quality of life and radiographic parameters of all enrolled study subjects will be evaluated-ed in addition.
Indications/Target Population	Patients suffering from severe shoulder pain and disability indicated for implantation of the ASHCOM Shoulder System and who meet all inclusion and none of the exclusion criteria.
Inclusion/Exclusion Criteria	Inclusion Criteria: • Patient is capable of understanding the doctor's explanations, following his instructions and is able to participate in the follow-up program. • Patient has given written consent to take part in the study by signing the "Patient Consent Form". • Patient is 18-80 years of age, inclusive. • Patient is skeletally mature. • Patient requires a primary, fracture or revision reverse total shoulder replacement for the relief of pain and has significant disability due to gross rotator cuff deficiency.

	• Patient's joint is anatomically and structurally suited to receive the selected implants. • Patient has a functional deltoid muscle. Exclusion Criteria: • Patient is unwilling or unable to give consent or to comply with the follow-up program. • Patients who have any condition which would in the judgement of the Investigator place the patient at undue risk or interfere with the study. Any patient who is institutionalized, or is a known drug abuser, a known alcoholic or anyone who cannot understand what is required of them. • Patient is known to be pregnant or breastfeeding. • Patient is a vulnerable subject. • Patient meets at least one of the contraindications: - Signs of infection - Significant injury to the upper brachial plexus - Non-functional deltoid muscle - Insufficient quality and/or quantity of glenoid or humeral bone - Any neuromuscular or vascular disease compromising the affected limb that would endanger the success of the intervention
Study Design	A multicenter, prospective, non-controlled post market surveillance study
Clinical Phase	Post-market
Sample Size	97 shoulders.
Length of Study	12 years (2 years enrollment plus 10 years follow-up): follow-up visits at 3 to 6 months, 1, 2, 5, and 10 years. Follow-up surveys at 3 and 7 years post-operatively.
Materials and Methods	Case report forms will be completed either in-office or hospital at Pre-op, Surgery, Discharge, and at the 3-6 months and at 1, 2, 5 and 10 year post-operation intervals. Patient completed follow-up surveys will be conducted at 3 and 7 years after surgery.
Data Collection	Paper/Electronic
Statistical Reporting	Data collected will be summarized and reported to each participating investigator. Statistical analysis will be

	conducted by Zimmer Biomet or its designee. Survivorship will be evaluated using Kaplan-Meier.
Scores/Performance Assessments	Constant-Murley, Oxford Shoulder Score, EuroQol (EQ-5D), Patient Satisfaction, Revisions, Adverse Events, Radiographic Assessment.
Standards	The PMCF is compliant with the below: • ISO 14155: 2020 - Clinical investigation of medical devices for human subjects - Good clinical practice. • The Declaration of Helsinki (DoH) – Ethical principles for medical research involving human subjects. • European Regulation (EU) 2017/745.
Study Funding	Funding for this clinical study is made available by Zimmer Biomet to support clinical data collection, IRB/EC review fees and other expenses associated with the conduct and execution of this study protocol as outlined in the fully executed Clinical Trial Agreement.

2 STATISTICAL ANALYSIS PLAN

2.1 Sample Size

This study is designed to have an alpha error no greater than 0.05. Based on an assumed survivorship of 86% at ten years, a sample size of n = 58 at ten years has at least 80% probability to compute a one-sided 95% lower confidence bound on the survivorship of the device with a half-width precision of 0.09. Sample size calculation was computed using SAS 9.4, Proc Power. To account for loss-to-follow-up estimated at 5% per year, 97 patients need to be enrolled in the study to have 58 patients at the end of ten years.
The half-width precision of 0.09 allows us to set a lower bound on survivorship of 9% from the expected survivorship performance of 86% at 10 years. This detectable change of 9% is analogous to non-inferiority margins that approach 10% in regulated studies

2.2 Statistical Analysis

Continuous data (e.g. age, BMI, Oxford Shoulder Score) will be reported using mean, standard deviation, median, and range. Comparisons between continuous baseline and interim patient visits will be performed using standard statistical tests and will be chosen as appropriate for the scale and distribution of the measures being analyzed. For example, a t-test, Wilcoxon test, or one-way ANOVA (as appropriate) may be performed to assess differences. Comparisons between preoperative and follow-up visit scores will use two-sided comparisons with $\alpha = 0.05$, with no adjustment for multiple comparisons.

Categorical data (e.g. gender) will be reported using frequency and percentage. Comparisons between categorical baseline and interim patient visits will be performed using standard statistical tests and will be chosen as appropriate for the scale and distribution of the measures being analyzed.