South Australian Policy Advisory Committee on Technology (SAPACT)

Health Technology Assessment (HTA) Decision Summary

Government of South Australia

SA Health

TGA Update (26 September 2019)
Sponsor has removed product from the ARTG.
Product is no longer available for use in Australia.

AeroForm Tissue Expander System™ for Post-mastectomy Breast Reconstruction

SAPACT MEETING DATE	16th SAPACT Meeting, 23 November 2018
APPLICATION #	1721
TECHNOLOGY	AeroForm Tissue Expander System™ (AirXpanders Inc.) *Needle-free patient-controlled wireless carbon dioxide breast tissue expander*
TECHNOLOGY CLASSIFICATION	TGA Active implantable medical devices (AIMD) – Implant; TGA class III high-risk (remote controller)
PATIENT INDICATION (TGA)	TGA intended purpose: For use in post-mastectomy patients to develop tissue coverage for the placement of a silicone or saline breast implant. The AeroForm is for temporary subcutaneous or sub-muscular implantation and is not intended for use beyond six months.

SAPACT DECISION

☒ Restricted recommendation for clinical use subjected to implementation under audit conditions (clinical outcomes evaluation).

In 2018, SAPACT received 2 application referrals from CALHN and SALHN clinicians to evaluate the potential use of a novel needle-free patient-controlled wireless carbon dioxide breast tissue expander named AeroForm in SA Health. SAPACT commenced the HTA process, inclusive of the development of a SAPACT Evidence Synopsis, consultations with applicants, clinical experts, presentation and deliberations at the SAPACT meetings, public decision summary and outcome evaluations.

SAPACT Advisory Recommendations

Based on the consideration of safety and clinical effectiveness and cost-effectiveness, SAPACT advised restricted recommendation of the AeroForm for clinical use subjected to implementation under audit conditions. Compared to the traditional saline expanders, evidence suggests that the AeroForm may benefit patients in terms of higher convenience (ease of use; patient-controlled expander; reduced clinic visits; and reduced time to breast implant exchange surgery). AeroForm has no clinical evidence of significant inferiority compared with saline expanders. The AeroForm costs about three times more than the saline expanders, however may be off-set by reduced clinic visits, staffing time and reduced patient costs for transport. Consequently, as recommended by the applicants, the types of patients who may benefit most from AeroForm are patients from rural and remote locations.

Hence as discussed at the SAPACT meeting, the following patient criteria are agreed for use of AeroForm in SA Health:

- SA Health patients from rural and remote locations
- TGA-approved indications: For use in post-mastectomy patients to develop tissue coverage for the placement of a breast implant
- Patients selected should follow the XPAND trial strict inclusion and exclusion criteria (detailed under 'Suitability of Patient Group').
- Patients may consider AeroForm as an alternative to saline tissue expanders.
- The AeroForm is MRI-incompatible.
- The AeroForm should not be used in conjunction with radiotherapy due to unclear clinical risks.

SAPACT discussed and removed the XPAND trial exclusion criteria on obesity (BMI >33) and restrictions on air travel for AeroForm based on the updated published scientific evidence and feedback from local clinicians.

Patients should be carefully selected and educated to ensure the best outcomes of the use of this new technology. Clinicians are required to provide SAPACT a 12-month report detailing monitoring and clinical outcomes, including the reasons for using AeroForm, patient criteria, number of outpatient visits between AeroForm implant and breast implant, patient satisfaction, successful tissue expansion and exchange to breast implant, discomfort and pain indicators, device-related adverse events as well as any costing analysis.

The 12-month reports, together with an updated international evidence review, will be reviewed by SAPACT for further recommendation on whether to accept AeroForm into routine clinical practice in SA Health.

REGULATORY APPROVALS

☒ **ARTG**: 30/10/2013	☒ **US FDA**: 3/4/2017	☒ **EU CE mark**: 25/10/2012

ARTG ID: 216704 AeroForm Patient Controlled Tissue Expander - Remotely-controlled tissue expander;
216653 AeroForm Tissue Expander System Dosage Controller Kit - Remotely-controlled tissue expander

QUALITY OF EVIDENCE

Quality of	One randomised controlled trial (RCT) – XPAND (N=150 women, 98 of whom received 168 AeroForm expanders; 52 of whom received

Evidence	88 saline expanders). The industry-sponsored RCT (non-blinded) was evaluated as being of moderate quality with a score of 9/13 (JBI appraisal tool). The patients were required to meet strict inclusion criteria. Four case series (total number of patients 71). The quality of the case series was not appraised due to the availability of higher level of evidence.
CLINICAL NEED	
Burden of Illness	Following mastectomy for the treatment of breast cancer, or to reduce the risk of breast cancer, women may choose to undergo a two-stage implant-based breast reconstruction. In Australia, there were 2,613 procedures of "removal of breast tissue expansion system and insertion of permanent prosthesis" in 2015-16. During the same period there were 7,691 procedures for "simple mastectomy" and a post-mastectomy breast reconstruction rate of 18.3%. At Flinders Medical Centre, 378 implants in 237 patients were undertaken as part of a two-stage implant-based breast reconstruction during the period 2014-16 (a mean of 119 patients per year). At the Royal Adelaide Hospital Breast Endocrine and Oncology Department, approximately 50-60 patients a year receive this service and at the Department of Plastic and Reconstructive Surgery, this service is provided (numbers unknown).
Need	After a mastectomy, some women choose to have breast reconstruction, either with prosthetic breast implants or autologous tissue. Post-mastectomy breast reconstruction helps improve affected women's quality of life and psychological well-being. At the time of mastectomy (or after), a tissue expander device is implanted temporarily to stretch the skin and chest muscles. Currently, tissue expansion is achieved using multiple saline injections into the tissue expander in a sterile setting administered by a nurse or surgeon at an outpatient clinic weekly or fortnightly until expansion is complete (2-10 outpatient clinic visits over 2-6 months). When the expansion is completed, the expander device is removed and exchanged with a permanent breast implant (two-stages). The AeroForm is a new tissue expansion implant that uses carbon dioxide gas in a canister instead of saline injections to expand tissue. It has a remote control controlled primarily by patients (surgeon too) to release a pre-determined amount of gas (10cc each time, maximum 3 times a day) and has a lifespan of 6 months. The AeroForm is expected to bring patients convenience and ease of use, reduce their outpatient visits and also reduce the time needed for tissue expansion, hence allowing them to have their exchange surgery quicker.
CLINICAL BENEFIT	
Safety	Although the XPAND RCT trial showed no statistically significant difference in adverse events between patients with AeroForm and saline tissue expanders, AeroForm was associated with a higher breast reconstruction failure rate (10.2% vs 6.8%) and device-related failure (4.1% vs 1.1%). AeroForm device-related adverse events included loss of communication with the controller (9.5%) and valve failure. Over-inflation (3%) was corrected via needle deflation by the clinician. Deflation (both gradual and sudden) occurred in 34 expanders (20%). No device rupture was reported for either group. Breast-related adverse events were similar in both groups in terms of type, severity and statistical significance ($p>0.05$). Overall the most commonly reported adverse events were postoperative wound complications, seroma, haematoma and postoperative wound infection. Device dislocation was slightly improved for AeroForm ($p=0.0392$). Adverse events reported in the case series were similar in type and frequency as to those reported in the RCT. Although 2 patients in the XPAND RCT received radiotherapy whilst the AeroForm device was implanted, clinical outcomes of these patients specifically with the use of radiotherapy were not reported.
Effectiveness	AeroForm showed statistically significant reduced median time to tissue expansion (21 vs 46 days; $p<0.0001$) and reduced median time to final breast reconstruction (108 days vs 136 days; $p=0.0001$), compared to saline tissue expanders. In terms of successful breast implantation (defined as successful tissue expansion and exchange to breast implant – primary outcome) and patient satisfaction, saline tissue expanders performed slightly better than AeroForm, although not statistically significant. Two iterations of the AeroForm were used in the XPAND trial; the latter enhanced device fared better in patient satisfaction and was considered more robust. Outcomes of the Australia-based small case series were generally in line with the results of the XPAND trial, with successful tissue expansion and breast reconstruction in 94% implantations (ASPIRE), and an average time to complete expansion of between 15 - 22 days.
SUITABILITY OF PATIENT GROUP	
Suitability of Patient Group	At the SAPACT meeting, the following patient criteria is proposed for use of AeroForm in SA Health: • SA Health patients from rural and remote locations (approved for an estimated 10 patients/year at SALHN based on SALHN's feedback and 5 patients per year at CALHN) who require 2-stage breast reconstruction post-mastectomy. • TGA-approved intended purpose: For use in post-mastectomy patients to develop tissue coverage for the placement of a silicone or saline breast implant. The AeroForm is for temporary subcutaneous or sub-muscular implantation and is not intended for use beyond six months. • Patients selected should follow the XPAND trial (Ascherman 2016) strict inclusion and exclusion criteria: Inclusion criteria o Female between 18 and 70 years old o Required tissue expansion as part of breast reconstruction

	o Able to provide informed written consent o Able and willing to comply with all of the study requirements o Physical, perceptual, and cognitive capacity to understand and manage at-home dosing regimen Exclusion criteria o Tissue integrity was unsuitable for tissue expansion o Residual gross tumor at the intended expansion site o Current or prior infection at the intended expansion site o Clinically significant fibrosis caused by previous irradiation (except in the event that autologous tissue will be used) or planned radiation therapy at the intended expansion site during the time the expander is implanted o History of failed tissue expansion or breast implantation at the intended expansion site o Comorbid condition determined by the investigator to place the subject at an increased risk of complications (e.g., o severe collagen vascular disease, poorly managed diabetes) o Concomitant medications determined by the investigator to place the subject at an increased risk of complications (e.g., prednisone, Coumadin) o Participating in concurrent investigational drug or device study o Current tobacco smoker o Currently implanted electronic device such as a pacemaker, defibrillator, neurostimulator device, or drug infusion device o Pregnant or planning on becoming pregnant during the study period o History of psychological condition or drug or alcohol misuse that may interfere with their ability to use the device safely • Patients not indicated for AeroForm will use saline tissue expanders. • The AeroForm is MRI-incompatible due to metal components which will affect its function. • The AeroForm should not be used in conjunction with radiotherapy due to unclear clinical risks. SAPACT discussed and removed the XPAND trial exclusion criteria on obesity (BMI >33) and restrictions on air travel for AeroForm based on the updated published scientific evidence and feedback from local clinicians. Patients should be carefully selected and educated to ensure the best outcomes of the use of this new technology. Clinicians are required to provide SAPACT a 12-month report detailing monitoring and clinical outcomes, including the reasons for using AeroForm, patient criteria, number of outpatient visits between AeroForm implant and breast implant, patient satisfaction, successful tissue expansion and breast implant, discomfort and pain indicators, device-related adverse events as well as costing analysis (for both AeroForm and saline injections).
FINANCIAL CONSIDERATION	
Device costs	Approximately $2400 per set of AeroForm tissue expander and dosage remote control. Each breast site requires 1 set. Each patient may require either 1 or 2 sets of AeroForm, depending on the type of mastectomy (uni- or bi-lateral). Proposed number of patients: 5 patients per year at CALHN and an estimated 10 patients/year at SALHN based on SALHN's feedback. Cost of comparator 1 saline tissue expander per breast site is approximately $800.
Value for Money	No published economic evaluation was identified. The usage of AeroForm may off-set costs in terms of reduced clinic visits (estimated 2 visits for AeroForm vs up to 8 visits for saline) and staff time.
Funding Approvals	MSAC: Not evaluated by MSAC. AeroForm is already on the Prosthesis List and can be used under existing MBS items. AHMAC Health Technology Reference Group: Listed for future review.
FEASIBILITY OF ADOPTION	
Organisational Feasibility	The new technology would use existing staff and infrastructure. Clinicians and patients will receive adequate case and follow-up support, take-home materials and outpatient training from the manufacturer. Patients will also have access to 24/7 phone support. Clinicians plan to conduct rigorous prospective data collection, including the formal recording and reporting using the Breast-Q tool for patient-reported outcomes [SALHN] and submission of data to the BreastSurgANZ Quality Audit and to the Australian Breast Device Registry [CALHN]. Clinical results are discussed at a 3 month morbidity and mortality meetings (with external review) [CALHN]. Both sites routinely record a range of metrics regarding patient criteria, therapies, adverse events and clinical outcomes.
Credentialing and Competency	The Clinician(s) should be appropriately credentialed and approved by the SA Health Credentialing and Scope of Practice Committee to implant the AeroForm (refer to paragraph 3.4.3 New Clinical Procedures, Technologies and Treatments of the SA Health Credentialing Policy Directive). Training is provided by the company to the surgeon, outpatient clinic staff and operating theatre staff to prepare the device for implantation and manage the expansion and patient training.

CONSISTENCY WITH EXPECTED SOCIETAL/ ETHICAL/ LEGAL VALUES	
Societal/ Ethical/ Legal Values	Clinicians will ensure that patient training and support are provided. The ability to control the timing and rate of expansion of the AeroForm may be beneficial to women who may experience a sense of loss of control after the breast cancer diagnosis. However, some women may prefer the saline expander for an increased clinical oversight. Patients may perceive the AeroForm as convenient as the expansion can be done at home. Hence, patients in remote and rural areas will likely benefit due to reduction in travel time. Patients who are modest may prefer AeroForm as they find it difficult to undergo repeated saline injections.
QUERIES TO	Dr Deborah Chen, Senior Scientific Officer – HTA/ Executive Officer SAPACT Medicines and Technology Programs, SA Department for Health and Ageing Level 8, Citi Centre Building, 11 Hindmarsh Square, Adelaide, SA 5000 Tel: +61 8 8226 7375; Email: Health.SAPACT@sa.gov.au
REVIEWER	Naomi Burgess, Director, Medicines and Technology Programs and Out of Hospital Pharmacy Services, SA Health
AUTHORISER	Prof Guy Maddern, SAPACT Chair