

Subject: Bronchial Thermoplasty		Original Effective Date: 6/12/14
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DISCLAIMER

This Molina Clinical Policy (MCP) is intended to facilitate the Utilization Management process. It expresses Molina's determination as to whether certain services or supplies are medically necessary, experimental, investigational, or cosmetic for purposes of determining appropriateness of payment. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered (i.e., will be paid for by Molina) for a particular member. The member's benefit plan determines coverage. Each benefit plan defines which services are covered, which are excluded, and which are subject to dollar caps or other limits. Members and their providers will need to consult the member's benefit plan to determine if there are any exclusion(s) or other benefit limitations applicable to this service or supply. If there is a discrepancy between this policy and a member's plan of benefits, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of a State, the Federal government or CMS for Medicare and Medicaid members. CMS's Coverage Database can be found on the CMS website. The coverage directive(s) and criteria from an existing National Coverage Determination (NCD) or Local Coverage Determination (LCD) will supersede the contents of this Molina Clinical Policy (MCP) document and provide the directive for all Medicare members.¹

DESCRIPTION OF PROCEDURE/SERVICE/PHARMACEUTICAL

Bronchial thermoplasty is a minimally invasive treatment that uses thermal energy (radiofrequency ablation) to weaken and partially destroy the smooth muscle in the lungs that constricts the airway during asthma attacks. This procedure is intended for treatment of severe, persistent asthma in patients who are age 18 years or older and with asthma that has not been well controlled by long-acting bronchodilators or glucocorticoids.³ The procedure generally involves three separate bronchoscopies under moderate sedation about three weeks apart. A radiofrequency controller and a specialized catheter are used to administer thermal energy (target tissue temperature 65°C) to the airway walls. All reachable airways distal to the mainstem bronchus that are 3 to 10 mm in diameter are treated once, except those in the right middle lobe, which are left untreated due to difficulty with access.^{23 24}

The Alair Bronchial Thermoplasty System (Boston Scientific Corp.) is regulated via the Premarket Approval (PMA) process as a Class III (high-risk) device and it is subject to the most stringent regulations enforced by the FDA. The FDA has classified it as a bronchial thermoplasty system and it received FDA approval on April 27, 2010.²

RECOMMENDATION³⁻¹⁷

Bronchial Thermoplasty is considered investigational and unproven for the treatment of asthma due to insufficient evidence in the peer reviewed literature.

SUMMARY OF MEDICAL EVIDENCE³⁻¹⁷

A small body of low-quality evidence suggests that during the first year after thermoplasty, benefits were observed, including improved quality of life (QOL), symptom relief, reduced medication use, and reductions in emergency department (ED) visits. Bronchial thermoplasty did not reduce hospitalizations following treatment and there was no evidence of improved lung function (e.g., forced expiratory volume in 1 second [FEV1]). Although preliminary evidence

suggests that this treatment poses little long-term safety risk, there is insufficient evidence concerning the long-term safety and efficacy of bronchial thermoplasty. A summary of the evidence is provided below.

Three randomized controlled trials (RCTs) have evaluated the Alair Bronchial Thermoplasty System for treatment of severe asthma.^{5 6 7} Although all of these studies were RCTs, one study enrolled less than 50 patients⁷ and two studies did not involve blinding or placebo controls.^{6 7} All of the reviewed studies evaluated thermoplasty as an adjunct to continued drug therapy for asthma using outcome measures, including respiratory parameters, medication usage, exacerbations of asthma, hospital visits, and assessments of quality of life. The initial reports of the RCTs involved only 1 year of follow-up; however, subsequent reports for two of the RCTs extended this follow-up to 2 or 5 years for patients who underwent Thermoplasty^{4 8} and one of these extensions included a subset of control group patients with 3 years follow-up.⁸ All of the studies were supported by the device manufacturer and performed in part by investigators who had financial relationships with the device manufacturer.^{5 6 7}

The largest available controlled study of thermoplasty for severe asthma was the Asthma Intervention Research (AIR2) trial that randomized 190 patients to thermoplasty and 98 patients to placebo treatment.⁵ Throughout the study, all patients continued drug therapy with no intentional or directed changes in medication use. At 1 year follow-up, the thermoplasty group had meaningful improvements compared with the control group for the following measures: severe exacerbations (0.48 versus 0.70 per patient annually, PPS=0.96), emergency department visits (0.07 versus 0.43 per patient annually, PPS>0.99), and days lost from work, school, or other activities due to asthma (1.3 versus 3.9 per year, PPS=0.99). In addition, the thermoplasty group had meaningful improvements in mean \pm standard deviation (SD) Asthma Quality of Life Questionnaire (AQLQ) scores (1.4 ± 1.1 versus 1.2 ± 1.2 , PPS=0.96); however, the degree of improvement in this measure (difference = 0.2) was much smaller than the improvement in the control group (+1.2), which can presumably be attributed to a placebo effect. Despite these improvements, no meaningful differences were noted between the thermoplasty group and the control group in mean respiratory parameters, total symptom score, symptom-free days, rescue medication use, unscheduled physician visits, hospitalizations, or the Asthma Control Questionnaire (ACQ) scores at 1 year follow-up.⁵ An additional year of uncontrolled follow-up of the thermoplasty group evaluated with traditional statistical tools showed no statistically significant differences within this group between 1 year and 2 years follow-up in severe exacerbations, asthma symptoms, emergency department visits or hospitalizations follow-up.⁴

Another RCT that enrolled 109 patients who had severe, persistent asthma found improvements similar to those reported above despite differences in study design.⁶ This trial was not blinded or placebo controlled and most of the outcomes were measured after attempted withdrawal of patients from long-acting b2-agonist (LABA) use. At 1 year follow-up, compared with the control group, thermoplasty was associated with statistically significant improvements in mean change in the following measures: AQLQ (higher score better) (+1.3 versus +0.6, P<0.005), ACQ (lower score better) (-1.2 versus -0.5, P<0.005), symptom free days (+41% versus +17%, P<0.01), symptom scores (lower score better) (-1.9 versus -0.7, P<0.05), rescue bronchodilator use (-8.9 versus -1.2 puffs per week, P<0.05), morning peak expiratory flow (+39 versus +9 liters per minute, P<0.005), mild exacerbations without LABA (-0.16 versus +0.04, P<0.01), and mild exacerbations with LABA (-0.17 versus +0.03, P<0.05). In contrast, at 1 year follow-up, no significant differences were seen between the thermoplasty group and the control group in severe exacerbations, airway responsiveness, or forced expiratory volume in 1 second (FEV1).⁶ A second report of this study extended follow-up to 5 years for 45 (82%) thermoplasty group patients and to 3 years for 24 (44%) control group patients.⁸ Thermoplasty was not associated with any serious long-term adverse events and at 3 years follow-up, airway responsiveness measured based on doublings of methacholine dose giving a 20% decrease in FEV1 increased 1.3 doublings for the thermoplasty group versus a decrease

of 0.4 doublings for the control group ($P < 0.05$). However, at 3 years follow-up, there were no significant differences between the thermoplasty group and the control group in other respiratory parameters, oral glucocorticoid use, worsening of asthma, emergency department visits, or hospitalizations.⁸ The apparent loss of benefits of thermoplasty during longer follow-up may indicate loss of effectiveness over time or may be an artifact of selective dropping out of control group patients who have the most poorly controlled asthma.

In the Research In Severe Asthma (RISA) trial 32 patients with severe asthma (prebronchodilator FEV1 ≥ 50 percent of predicted) were randomly assigned to BT or control (without sham procedure) but investigators were not blinded.⁷ This trial was not blinded or placebo controlled and patients underwent attempted weaning from oral and inhaled glucocorticoids during weeks 22 to 36 of the study and maintenance of reduced steroid use during weeks 37 to 52 of the study. Compared with the control group at 22 weeks follow-up (before steroid weaning), thermoplasty was associated with statistically significant improvements in mean change in the following measures: FEV1 (+15% versus -1%, $P < 0.05$), AQLQ (higher score better) (+1.2 versus +0.2, $P < 0.05$), ACQ (lower score better) (-1.0 versus -0.1, $P < 0.05$), and rescue bronchodilator use (-27% versus -2%, $P < 0.05$). Except for FEV1, improvements in these measures remained statistically significant at 52 weeks follow-up, after reduction of steroid dosages. Compared with the control group at 52 weeks, thermoplasty was associated with statistically significant improvements in mean AQLQ (higher score better) (+1.5 versus +0.4, $P < 0.05$), mean ACQ (lower score better) (-1.0 versus -0.2, $P < 0.05$), and mean rescue bronchodilator use (-26% versus -6%, $P < 0.05$).³

In a follow-up of 162 patients who underwent BT in the AIR2 trial, the effectiveness and safety of BT was evaluated in a prospective study 5 years after therapy.³ Outcomes assessed after BT included severe exacerbations, adverse events, health care use, spirometric data, and high-resolution computed tomographic scans. The proportion of subjects experiencing severe exacerbations and emergency department (ED) visits and the rates of events in each of years 1 to 5 remained low and were less than those observed in the 12 months before BT treatment (average 5-year reduction in proportions: 44% for exacerbations and 78% for ED visits). Respiratory adverse events and respiratory-related hospitalizations remained unchanged in years 2 through 5 compared with the first year after BT. Prebronchodilator FEV1 values remained stable between years 1 and 5 after BT, despite a 18% reduction in average daily inhaled corticosteroid dose. High-resolution computed tomographic scans from baseline to 5 years after BT showed no structural abnormalities that could be attributed to BT. However; there was no follow up of the control group, making comparisons difficult.³

Cochrane: A 2014 Cochrane review was published on the efficacy and safety of bronchial thermoplasty in adults with bronchial asthma. Three trials (429 participants) were included (two trials compared bronchial thermoplasty vs medical management and the other compared bronchial thermoplasty vs a sham intervention). The results from two trials showed a lower rate of exacerbation after 12 months of treatment for participants who underwent bronchial thermoplasty. The trial with sham intervention showed a significant reduction in the proportion of participants visiting the emergency department for respiratory symptoms, from 15.3% on sham treatment to 8.4% over 12 months following thermoplasty. The trials showed no significant improvement in pulmonary function parameters (with the exception of a greater increase in morning peak expiratory flow (PEF) in one trial). Treated participants who underwent bronchial thermoplasty had a greater risk of hospitalization for respiratory adverse events during the treatment period (3 trials, 429 participants; risk ratio 3.50, 95% CI 1.26 to 9.68; high-quality evidence), which represents an absolute increase from 2% to 8% (95% CI 3% to 23%) over the treatment period. This means that six of 100 participants treated with thermoplasty (95% CI 1 to 21) would require an additional hospitalization over the treatment period. No significant difference in the risk of

hospitalization was noted at the end of the treatment period. The review concluded that bronchial thermoplasty for patients with moderate to severe asthma provides a modest clinical benefit in quality of life and lower rates of asthma exacerbation, but no significant difference in asthma control scores.⁹

Professional Organizations¹⁸⁻²¹

No clinical practice guidelines for bronchial thermoplasty were identified from the American Academy of Allergy, Asthma and Immunology (AAAAI), American College of Chest Physicians (ACCP)¹³ or American Thoracic Society (ATS).

British Thoracic Society (BTS): In its evidence-based guidelines addressing bronchoscopic procedures, the BTS concluded that, in patients who have moderate to severe asthma, bronchial thermoplasty has been associated with a short-term increase in symptoms related to asthma. However, this procedure causes a reduction in symptoms beginning approximately 6 weeks after the final thermoplasty treatment. Specific benefits of this procedure are fewer asthma exacerbations, improvements in quality of life, and fewer days lost from work or school due to asthma. Therefore, the BTS recommends thermoplasty as a potential treatment option in carefully selected patients who have severe, persistent asthma and who are on maximal therapy. Despite this recommendation, the BTS cautions that the long-term safety and efficacy of thermoplasty are unclear so the clinical role of thermoplasty in asthma remains to be established and this treatment should only be performed at a limited set of specialist centers. The BTS also recommends longer-term follow-up of patients who undergo Thermoplasty.¹⁸

Global Initiative for Asthma (GINA): After reviewing the available evidence concerning thermoplasty, GINA concluded that thermoplasty is a potential option for highly selected adult patients who have uncontrolled asthma despite use of recommended therapeutic regimens and referral to an asthma specialty center. Caution should be used in selecting patients for this procedure, as the number of published clinical trials assessing this procedure is small, and excluded patients with chronic sinus disease, frequent chest infections, and FEV1 < 60% predicted. The long-term safety and efficacy of thermoplasty are not known and GINA recommends that more carefully controlled trials are needed, as a large placebo effect has been seen in studies to date.²⁰

European Respiratory Society (ERS) / American Thoracic Society (ATS): Guidelines prepared jointly by the ERS and ATS strongly recommend that bronchial thermoplasty be performed only in adults with severe asthma and only in the context of a clinical trial or independent systematic registry. The ERS and ATS consider the available evidence concerning this procedure to be of very low quality and have very low confidence in the reported efficacy of thermoplasty in patients who have severe asthma. Since potential benefits and harms of thermoplasty may be large and its long-term consequences are unknown, the ERS/ATS guideline calls for additional studies to assess its long-term benefits and safety, including determining its influence on asthma exacerbation rates and lung function, ascertaining the phenotypes of patients who respond to this treatment, and evaluating its effects on patients who require systemic steroid treatment or who have severe obstructive asthma. The ERS and ATS anticipate that additional research will have an important impact on their recommendations concerning thermoplasty.¹⁹

National Institute for Health and Clinical Excellence (NICE): Evidence-based guidance prepared by the NICE states that, for patients with severe asthma, bronchial thermoplasty has been shown to provide some improvements in symptoms and quality of life and reductions in exacerbations and hospital admissions. Although evidence of safety is adequate in the short and medium term, more evidence of long-term safety is needed; therefore, thermoplasty should only be used after

establishment of special arrangements for clinical governance, including patient consent and research or audit. The NICE encourages additional research to evaluate the long-term safety and efficacy of thermoplasty.²¹

CODING INFORMATION: THE CODES LISTED IN THIS POLICY ARE FOR REFERENCE PURPOSES ONLY. LISTING OF A SERVICE OR DEVICE CODE IN THIS POLICY DOES NOT IMPLY THAT THE SERVICE DESCRIBED BY THIS CODE IS A COVERED OR NON-COVERED. COVERAGE IS DETERMINED BY THE BENEFIT DOCUMENT. THIS LIST OF CODES MAY NOT BE ALL INCLUSIVE.

CPT	Description
31660	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with bronchial thermoplasty, 1 lobe
31661	Bronchoscopy, rigid or flexible, including fluoroscopic guidance, when performed; with bronchial thermoplasty, 2 or more lobes

HCPCS	Description
	N/A

ICD-10	Description: [For dates of service on or after 10/01/2015]
J45.20-J45.998	Asthma code range

RESOURCE REFERENCES

Government Agency

- Centers for Medicare & Medicaid Services (CMS). Medicare Coverage Database. Advanced Search: National Coverage Documents [search: asthma, bronchial thermoplasty]. Available at: <http://www.cms.gov/medicare-coverage-database/search/advanced-search.aspx>.
- Center for Devices and Radiological Health (CDRH). Premarket Approval (PMA) Database [search: P080032]. Alair Bronchial Thermoplasty System. April 27, 2010. Food and Drug Administration [website]. Available at: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMA/pma.cfm>.

Peer Reviewed Literature

- Wechsler ME, Laviolette M, Rubin AS et al. Bronchial thermoplasty: Long-term safety and effectiveness in patients with severe persistent asthma. *J Allergy Clin Immunol*. 2013 Aug 30
- Castro M, Rubin A, Laviolette M, Hanania NA, Armstrong B, Cox G. Persistence of effectiveness of bronchial thermoplasty in patients with severe asthma. *Ann Allergy Asthma Immunol*. 2011;107(1):65-70.
- Castro M, Rubin AS, Laviolette M, et al. Effectiveness and safety of bronchial thermoplasty in the treatment of severe asthma: a multicenter, randomized, double-blind, sham-controlled clinical trial. *Am J Respir Crit Care Med*. 2010;181(2):116-124.
- Cox G, Thomson NC, Rubin AS, et al. Asthma control during the year after bronchial thermoplasty. *N Engl J Med*. 2007;356(13):1327-1337.
- Pavord ID, Cox G, Thomson NC, et al. Safety and efficacy of bronchial thermoplasty in symptomatic, severe asthma. *Am J Respir Crit Care Med*. 2007;176(12):1185-1191.
- Thomson NC, Rubin AS, Niven RM, et al. Long-term (5 year) safety of bronchial thermoplasty: Asthma Intervention Research (AIR) trial. *BMC Pulm Med*. 2011;11:8.

9. Torrego AI, Sol I, Munoz AM, Roqu I Figuls M, Yepes-Nuez JJ, Alonso-Coello P, Plaza V. Bronchial thermoplasty for moderate or severe persistent asthma in adults. *Cochrane Database Syst Rev*. 2014 Mar 3;3:CD009910.
10. Bicknell S, Chaudhuri R, Thomson NC. How to: Bronchial thermoplasty in asthma. *Breathe*. 2014;10(1):48-59.
11. Chakir J, Haj-Salem I, Gras D, et al. Effects of bronchial thermoplasty on airway smooth muscle and collagen deposition in asthma. *Ann Am Thorac Soc*. 2015;12(11):1612-1618.
12. Doeing DC, Mahajan AK, White SR, Naureckas ET, Krishnan JA, Hogarth DK. Safety and feasibility of bronchial thermoplasty in asthma patients with very severe fixed airflow obstruction: a case series. *J Asthma*. 2013;50(2):215-218.
13. Zafari Z, Sadatsafavi M, Marra CA, Chen W, FitzGerald JM. Cost-effectiveness of bronchial thermoplasty, omalizumab, and standard therapy for moderate-to-severe allergic asthma. *PLoS ONE*. 2016;11(1):e0146003.
14. Zein JG, Menegay MC, Singer ME, et al. Cost effectiveness of bronchial thermoplasty in patients with severe uncontrolled asthma. *J Asthma*. 2016;53(2):194-200.
15. Zhou JP, Feng Y, Wang Q, Zhou LN, Wan HY, Li QY. Long-term efficacy and safety of bronchial thermoplasty in patients with moderate-to-severe persistent asthma: a systemic review and meta-analysis. *J Asthma*. 2016;53(1):94-100.
16. Niven RM, Simmonds MR, et al. Indirect comparison of bronchial thermoplasty versus omalizumab for uncontrolled severe asthma. *J Asthma*. 2018 Apr;55(4):443-451. doi: 10.1080/02770903.2017.1337789. Epub 2017 Jul 14
17. Chupp G, Laviolette M, et al. Long-term outcomes of bronchial thermoplasty in subjects with severe asthma: a comparison of 3-year follow-up results from two prospective multicentre studies. *Eur Respir J*. 2017 Aug 31;50(2). pii: 1700017. doi: 10.1183/13993003.00017-2017. Print 2017 Aug.

Professional Society Guidelines

18. British Thoracic Society (BTS). British Thoracic Society Guideline for Advanced Diagnostic and Therapeutic Flexible Bronchoscopy in Adults. January 4, 2012. Available at: <http://www.brit-thoracic.org.uk/Portals/0/Guidelines/BronchoscopyGuidelines/BTS%20Advanced%20Bronchoscopy%20guidelin e%20November%202011.pdf>.
19. Chung KF, Wenzel SE, Brozek JL, et al. International ERS/ATS guidelines on definition, evaluation and treatment of severe asthma. *Eur Respir J*. 2014;43(2):343-373.
20. Global Initiative for Asthma (GINA). Global Strategy for Asthma Management and Prevention. Updated 2018. Available at: <http://ginasthma.org/2018-gina-report-global-strategy-for-asthma-management-and-prevention/>
21. National Institute for Health and Care Excellence (NICE). Bronchial thermoplasty for severe asthma [IPG419]. 2012. Available at: <https://www.nice.org.uk/guidance/ipg419>.

Other Resources

22. Advanced Medical Review (AMR): Policy reviewed by a physician Board certified in Internal Medicine, Pulmonary Disease, Critical Care, Sleep Medicine. May 4, 2014.
23. UpToDate: [website]. Waltham, MA: Walters Kluwer Health; 2019. Wenzel S. Treatment of severe asthma in adolescents and adults.
24. Boston Scientific website. Available at: <http://www.btforasthma.com/>.
25. Hayes Medical Technology Directory. Winifred Hayes Inc. Lansdale, Pa.
 - Bronchial Thermoplasty for Treatment of Asthma. May 26, 2016. Updated April, 2018
 - Alair Bronchial Thermoplasty System for Treatment of Asthma. Winifred Hayes Inc. Lansdale, Pa. Sep 25, 2013 [archived]

26. Chupp G, Laviolette M, Cohn L, et al. Long-term outcomes of bronchial thermoplasty in subjects with severe asthma: a comparison of 3-year follow-up results from two prospective multicentre studies. *Eur Respir J* 2017; 50: 1700017

Review/Revision History:

6/12/14: Policy created

12/16/15 & 6/15/16: Policy reviewed, no changes

3/30/17 & 7/10/18: Policy was reviewed and the clinical criteria section did not change. The following sections were updated: Summary of medical evidence, guidelines and references.

6/19/19: Policy reviewed, no changes.