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Cervix Cancer Research Network

Elekta Brachytherapy in Eastern Europe

Jan De Becker
Elekta Brachytherapy

Cervix Cancer Education Symposium, February 2018

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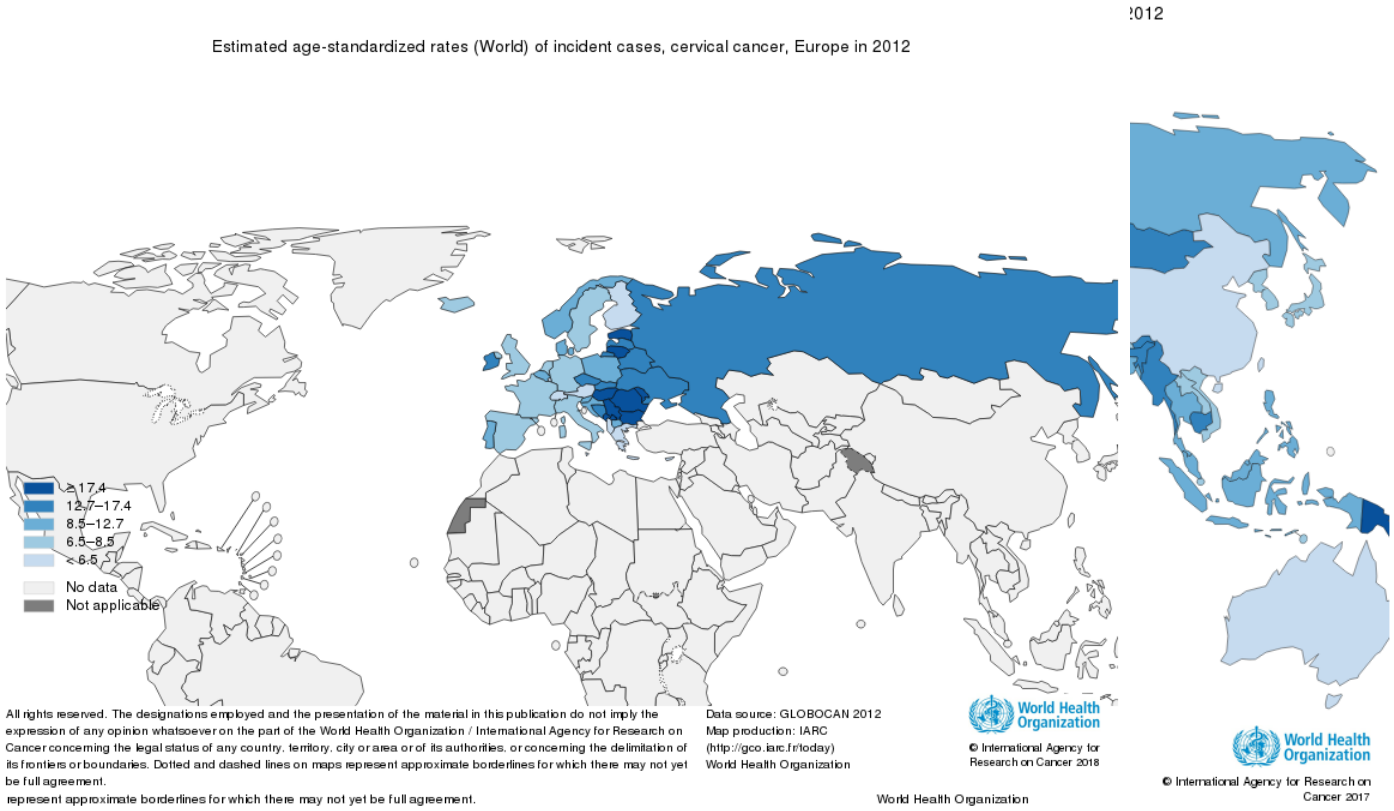
Cervical Cancer Incidence



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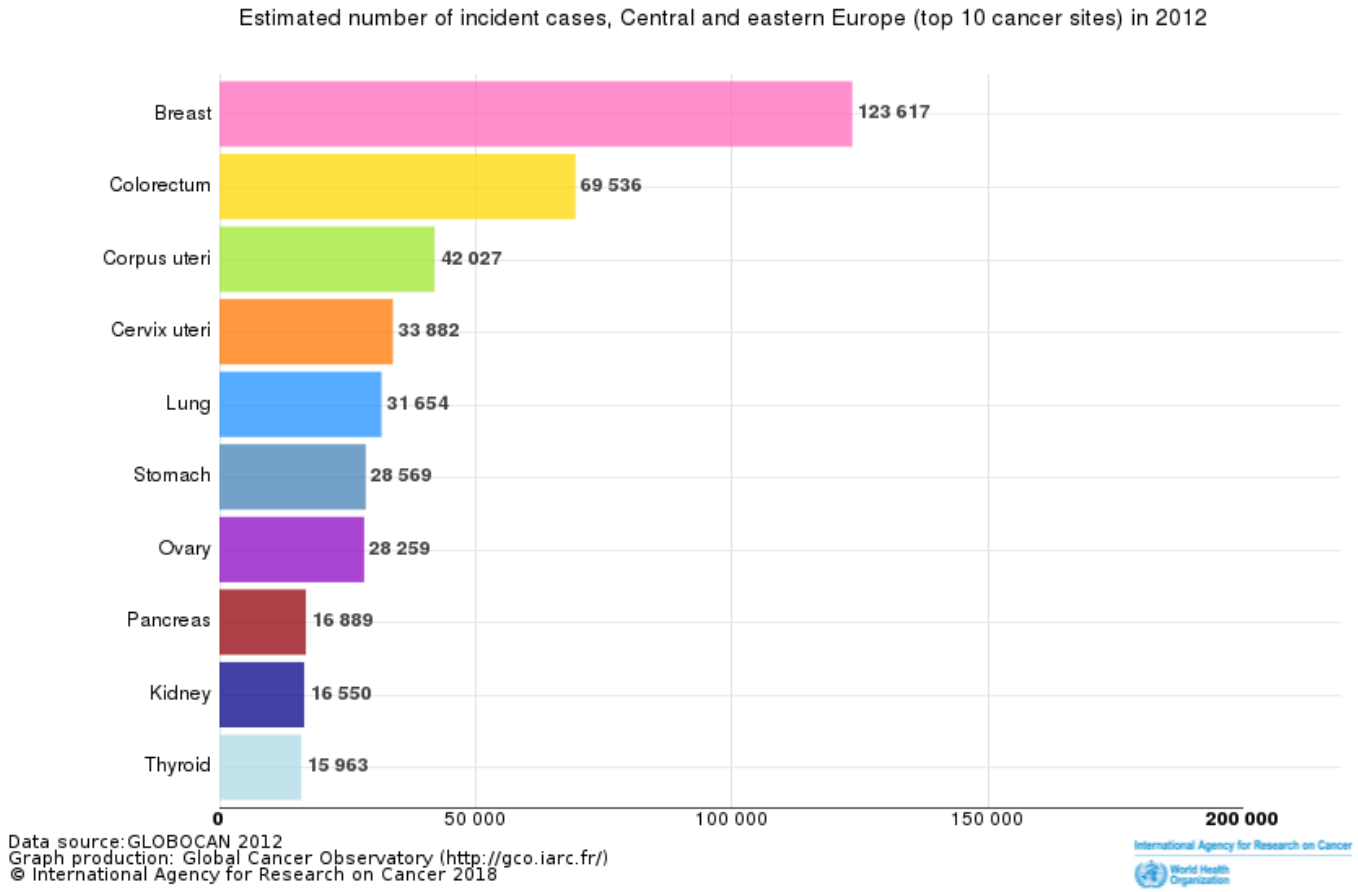

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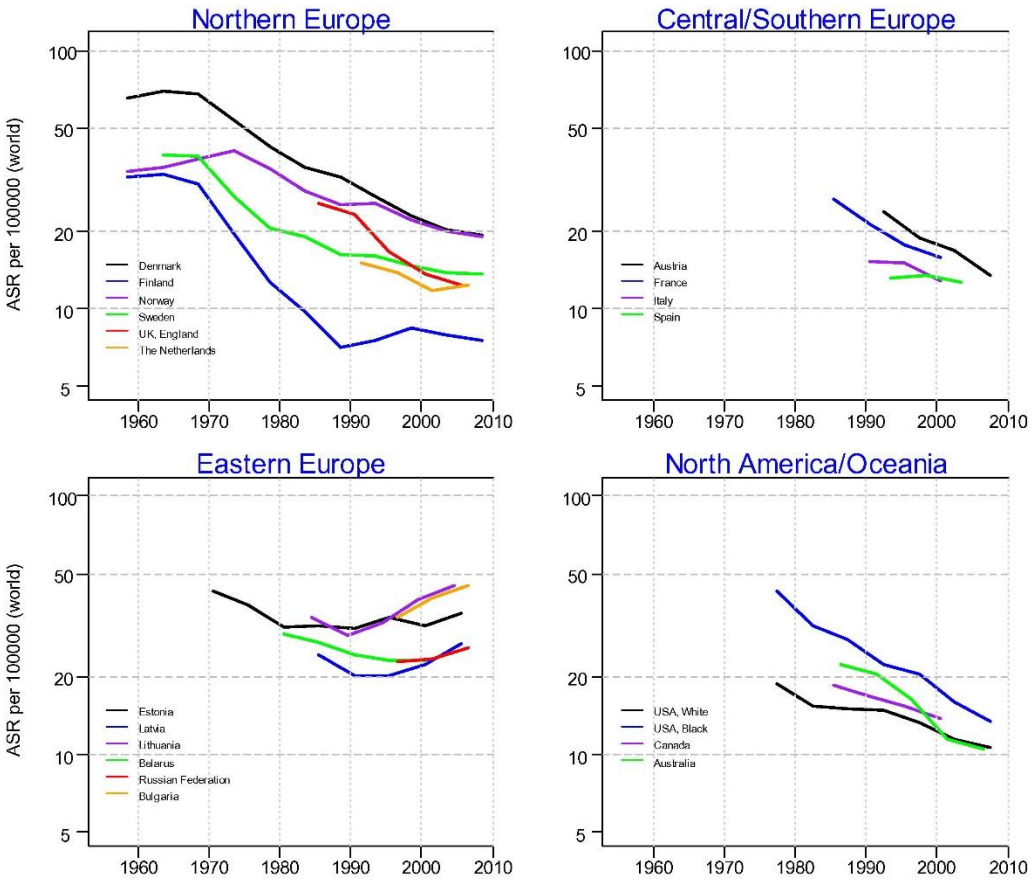

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Trends in GYN Brachytherapy

- Treatment Regimen and Competing Modalities
  - The Need of Brachytherapy
- 3D Image Guided Adaptive Brachytherapy
  - Supported by Clinical Outcome
  - Guidelines and recommendations
- Interstitial Brachytherapy
  - Growing Need

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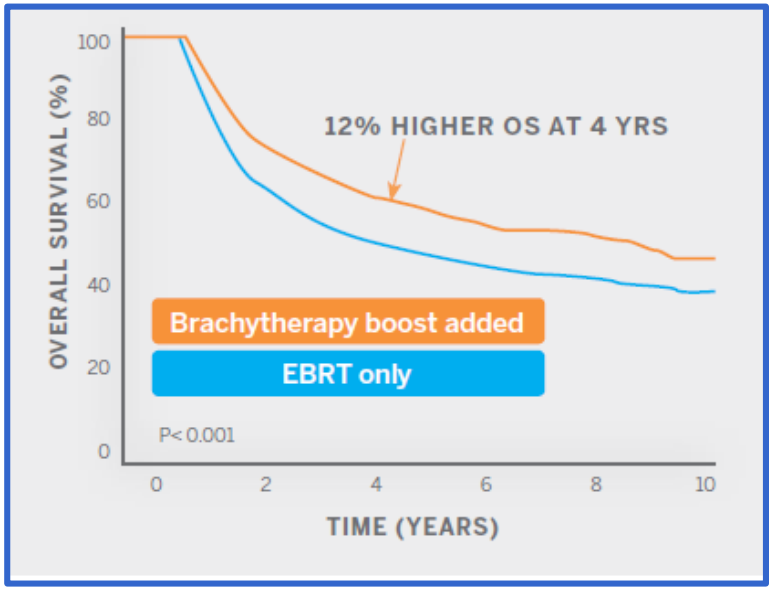
Brachytherapy

Essential part in treatment of cervical cancer



In a recent study, cervical cancer patients that received brachytherapy as boost after external beam radiation therapy had a 12% better overall survival rate at four years than patients who didn't receive the brachytherapy boost.[1]

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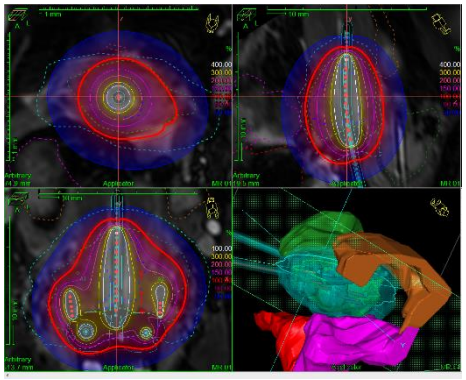
[1] Han K et al. Int J Radiation Oncol Biol Phys 2013;87:111-119

3D IGABT

- Insertion of a CT/MRI compatible applicator with or without needles
- 3D Imaging (CT or MRI) with the applicator inserted
- Applicator Reconstruction on 3D Data
- Contouring
  - HR- CTV: High Risk Clinical Target Volume
  - IR-CTV: Intermediate Risk Clinical Target Volume
  - OAR: Organs At Risk
    - Bladder
    - Rectum
    - Sigmoid
- Dose plan adapted to the patients' case



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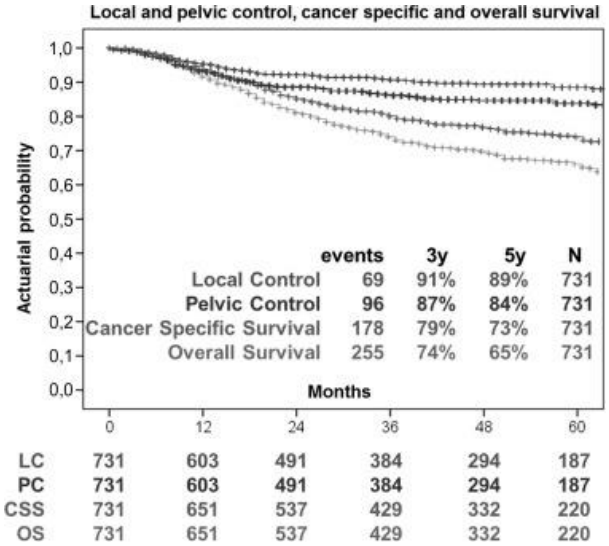
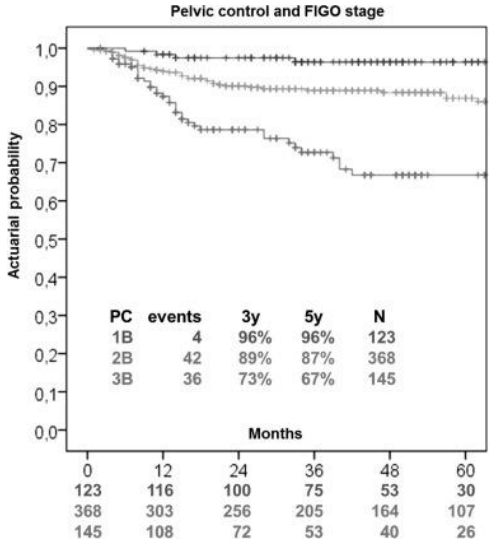
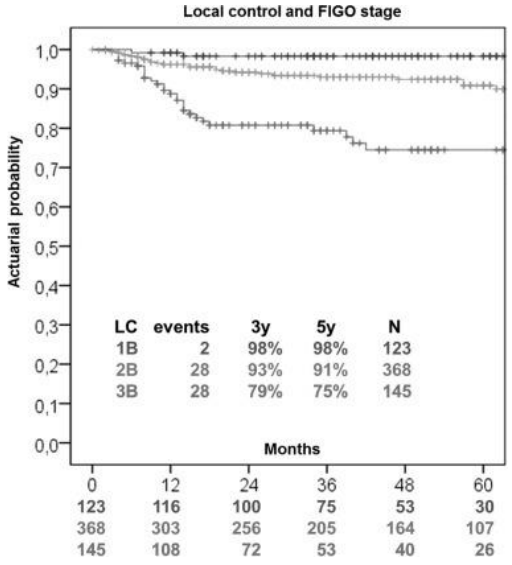
3D IGABT Improves Clinical Outcome







RetroEMBRACE Multi-center Study
IGBT improves pelvic control by approximately 10% compared to conventional 2D BT. [1]
IGBT improves overall survival compared to historical data [1] [8] [9]

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[1] Sturdza et al, Radiother Oncol. 2016

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3D IGABT Improves Clinical Outcome

RetroEMBRACE FIGO stage	Total number of patients	Overall Survival at 5 years	Cancer Specific Survival at 5 years
IB	123	83%	90%
IIA	42	80%	84%
IIB	368	70%	77%
IIIA	23	42%	48%
IIIB	145	42%	53%
IVA	23	32%	40%
Total	731	65%	73%

[1] Sturdza et al, Radiother Oncol. 2016

FIGO Stage	5-Year Observed Survival Rate
0	93%
IA	93%
IB	80%
IIA	63%
IIB	58%
IIIA	35%
IIIB	32%
IVA	16%
IVB	15%

Based on data collected by the USA National Cancer Data Base from people diagnosed between 2000 and 2002

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The above mentioned figures are not fully comparable.

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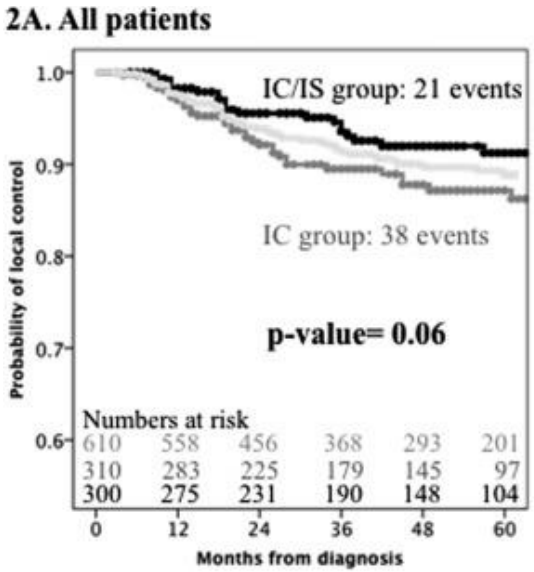
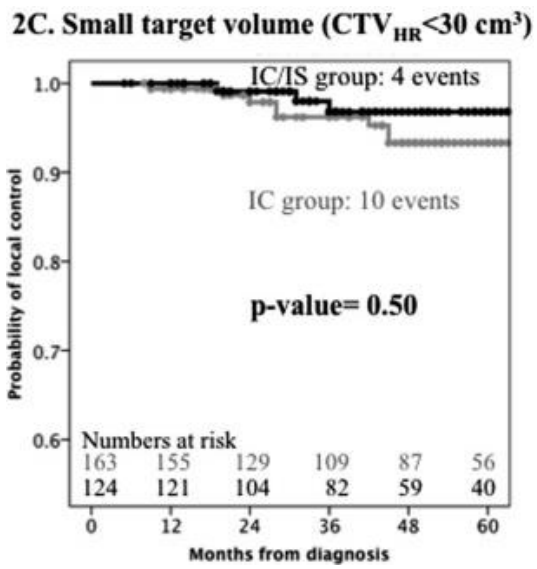
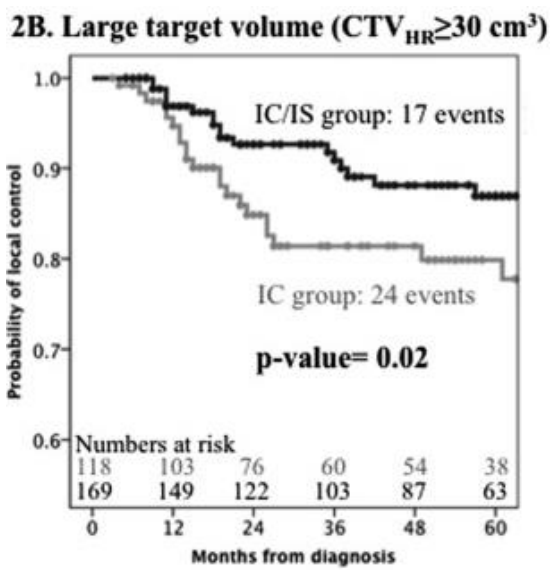
3D IGABT with interstitial needles improves Local Control







Combined IC/IS brachytherapy improves local control by enabling a tumour specific dose escalation resulting in significantly higher local control in large tumours without adding treatment related late morbidity. [1]

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[1] Fokdal et al, Radiother Oncol. 2016

3D IGABT - Less severe vaginal morbidity

Clinical Investigation: Gynecologic Tumor

Manifestation Pattern of Early-Late Vaginal Morbidity After Definitive Radiation (Chemo)Therapy and Image-Guided Adaptive Brachytherapy for Locally Advanced Cervical Cancer: An Analysis From the EMBRACE Study

Conclusion: Severe vaginal morbidity within the first 2 years after definitive radiation (chemo)therapy including IGABT with intracavitary/interstitial techniques for locally advanced cervical cancer is limited and is significantly less than has been reported from earlier studies. Thus, the new adaptive target concept seems to be a safe treatment with regard to the vagina being an organ at risk. However, mild to moderate vaginal morbidity is still pronounced with currently applied IGABT, and it needs further attention. © 2014 Elsevier Inc.

Kirchheiner K et al. Int J radiat Oncol Biol Phys 2014;89:88-95

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3D IGABT - Less severe rectal morbidity

Image guided brachytherapy in cervical cancer

Dose–volume effect relationships for late rectal morbidity in patients treated with chemoradiation and MRI-guided adaptive brachytherapy for locally advanced cervical cancer: Results from the prospective multicenter EMBRACE study ☆

Renaud Mazeron [a,*], Lars U. Fokdal [b], Kathrin Kirchheiner [c], Petra Georg [c], Noha Jastaniyah [c], Barbara Šegedin [d], Umesh Mahantshetty [e], Peter Hoskin [f], Ina Jürgenliemk-Schulz [g], Christian Kirisits [c], Jacob C. Lindegaard [b], Wolfgang Dörr [c], Christine Haie-Meder [a], Kari Tanderup [b], Richard Pötter [c], on behalf of the EMBRACE collaborative group [1]

Conclusions: Significant correlations were established between late rectal morbidity, overall and single endpoints, and dose–volume (D_{2cm^3}, $D_{0.1cm^3}$) and dose-point (D_{ICRU}) parameters. A $D_{2cm^3} \leqslant 65$ Gy is associated with more minor and less frequent rectal morbidity, whereas a $D_{2cm^3} \geqslant 75$ Gy is associated with more major and more frequent rectal morbidity.

[1] Mazeron et al, Radiother Oncol. 2016

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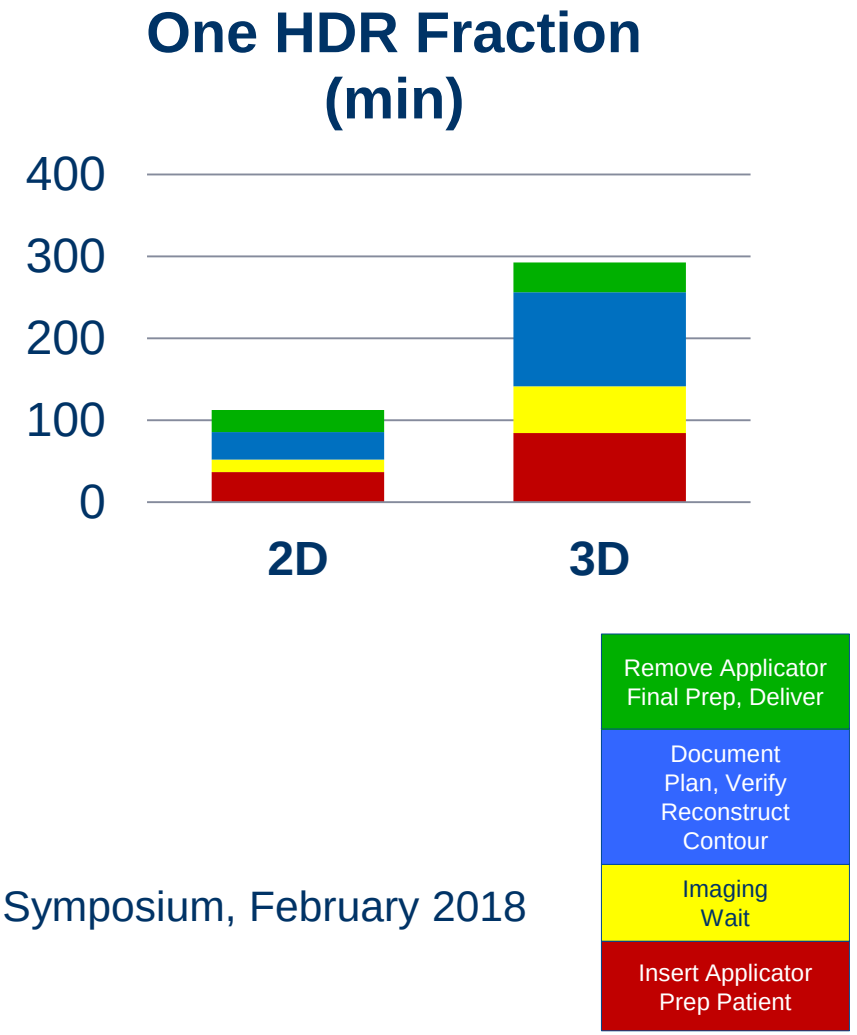
Challenges & Hurdles

- 3D IGABT
  - Long procedures
  - Invasive
  - Lot of staff involved
- Reimbursement
  - Low Reimbursement Rates
- Access to equipment
  - Radiotherapy Centers
  - Afterloaders
  - Sources
- Logistics & Infrastructure
  - Access to Operating Room
  - Nursing
  - Anesthesia
- Skills Set



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Elekta

- Engagement with the key stakeholders in the treatment of Cervical Cancer
- Clinical Trial support
- Education
- Product/Procedure support and customer training
- Innovation

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Support of EMBRACE 1 and EMBRACE 2 studies

Radiotherapy and Oncology 120 (2016) 365–369

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

Editorial

Image Guided Adaptive Brachytherapy in cervix cancer: A new paradigm changing clinical practice and outcome

Kari Tanderup [a], Jacob Christian Lindegaard [a], Christian Kirisits [b], Christine Haie-Meder [c], Kathrin Kirchheiner [b], Astrid de Leeuw [d], Ina Jürgenliemk-Schulz [d], Erik Van Limbergen [e], Richard Pötter [b,*]

[a] Aarhus University Hospital, Department of Oncology, Denmark; [b] Medical University of Vienna, Comprehensive Cancer Center, Department of Radiation Oncology, Austria; [c] Gustave Roussy Cancer Campus Grand Paris, Department of Radiation Oncology, Villejuif, France; [d] University Medical Center Utrecht, Department of Radiotherapy, The Netherlands; and [e] Department of Radiation Oncology, University Hospital Gasthuisberg, Leuven, Belgium

Image Guided Adaptive Brachytherapy (IGABT) in locally advanced cervical cancer (LACC) is increasingly recognized as the new paradigm replacing 2D brachytherapy and spreading throughout the world. This spread is at present predominantly in Europe [1], North America [2] and in major centres in Asia. The Gyn GEC ESTRO Recommendations I–IV [3–6] on MRI based IGABT have been used as the conceptual frame for these developments during the last decade and are now embedded into the recently published

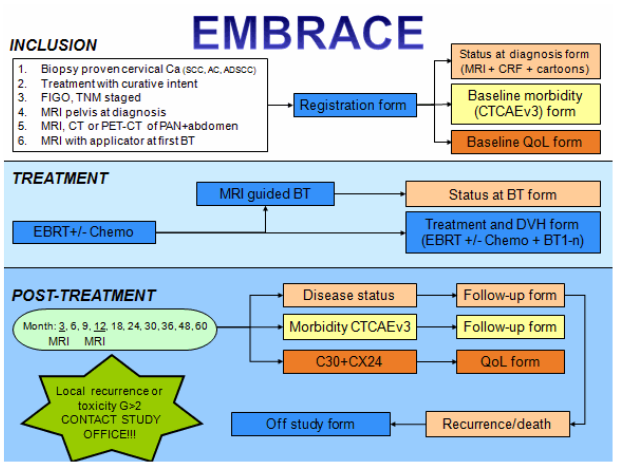
Clinical outcome

There is growing clinical evidence that IGABT combined with radiochemotherapy leads overall to improved clinical outcome compared to 2D brachytherapy. This evidence is based on retrospective mono-institutional cohorts [15–18,44–48], on the prospective multicentre French comparative STIC trial [49] and now also on results from the RetroEMBRACE [19,20,24] and

EMBRACE { An intErnational study on MRI-guided BRachytherapy in locally Advanced CErvical cancer }

About Embrace | Contacts | Participation | Login

Synopsis



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Support of GCIG and CCRN

- Gynecologic Cancer Intergroup (GCIG)
  - Global studies in endometrial and cervical cancer
- More focused collaboration with Cervix Cancer Research Network (CCRN)
  - Leading up to meeting today

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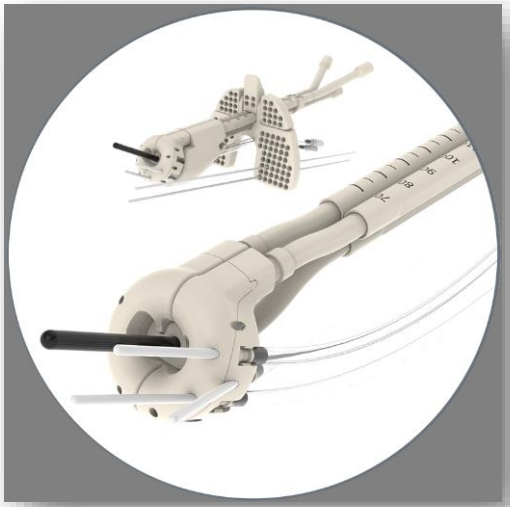
Elekta solutions for image-guided adaptive brachytherapy



Largest CT/MR compatible applicator portfolio

Now also a new option for advanced staged cervical cancer: Venezia*™

Intelligent tools to simplify treatment planning – eg. speed up reconstruction and optimize dosimetry

State of the art treatment delivery: Intuitive, safe, accurate

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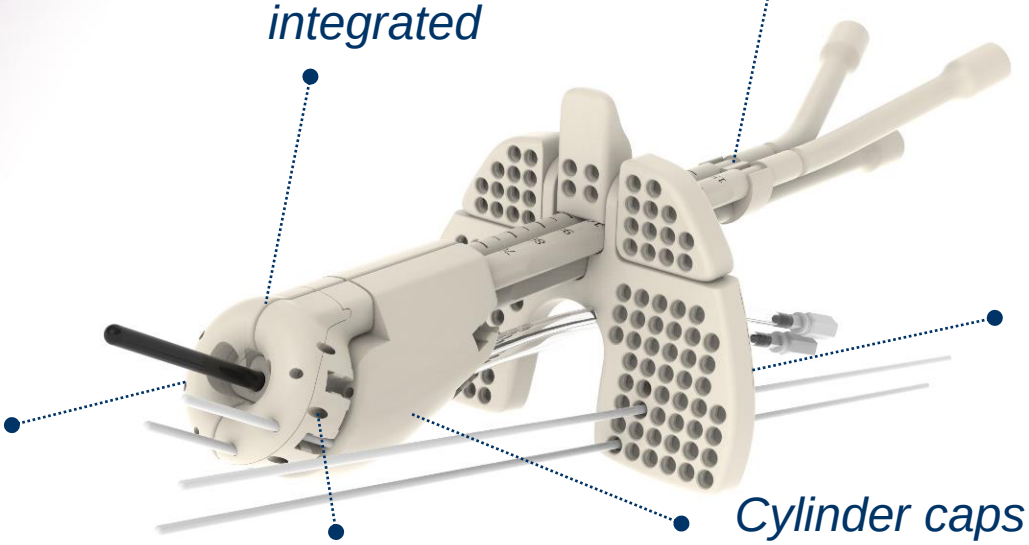
Advanced Gynecological Applicator Venezia™

One-click system for easy assembly

Cervical stopper integrated



Perineal templates for reaching vaginal extensions

2 lunar-shaped ovoids that when clicked together form a ring

The ovoid holes allow parallel and oblique needles to reach the parametrium

Cylinder caps allow treatment of the vaginal wall

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- Educational concept with distinct identity
- Focused on general brachytherapy and clinical workflow rather than products
- For Health Care Professionals with interest in Brachytherapy
- Structured and organised
- Long-term relationship with customers
- Easy accessible

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The “one-stop-shop” for Brachy-education

- **Peer-to-Peer** Brachytherapy education
  - Educational Workshops
  - Educational Centers
  - On-site support (proctoring)
  - Fellowships

- Residency programmes
  - Physicians
  - Physicists

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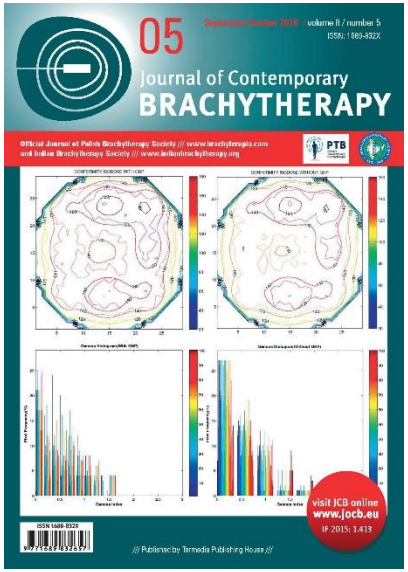
Other components BrachyAcademy

- What's new in Brachytherapy
- Medical information (e-Library)
  - Research & publications
  - Awareness materials
- Educational video's
- Other:
  - BrachyTalk
  - Webcasts
- Educational Activity Corner Journal of Contemporary Brachytherapy
- Employee Medical Education



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BrachyAcademy Workshops

Body (tumor) sites

- Gyn (cervix)
- Prostate
- Breast
- Robot-Assisted Bladder Brachytherapy
- Head & Neck
- Rectum
- Skin

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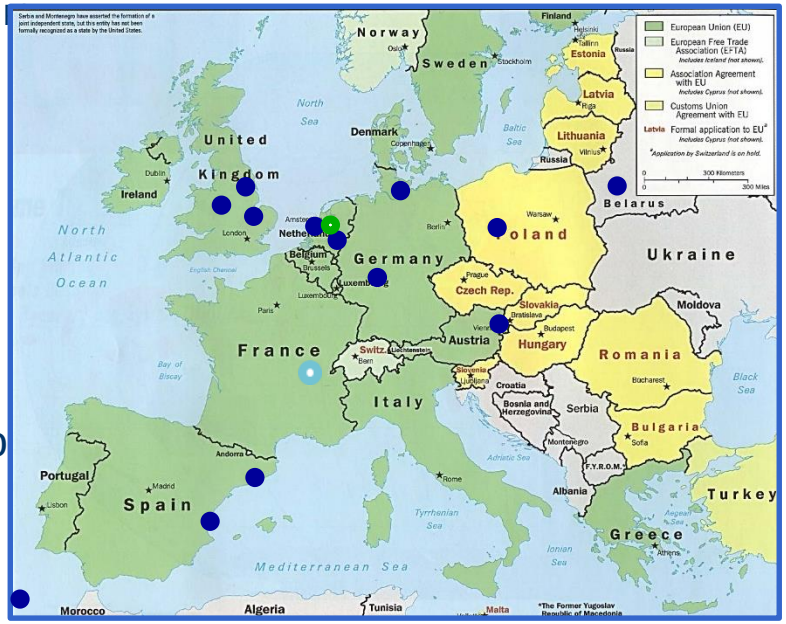
BrachyAcademy Educational Centers Europe

• **Austria**	Medical University of Vienna / AKH (G*)
• **Belarus**	N.N. Alexandrov National Cancer Centre, Minsk (P)
• **France**	Hôpital Centre Léon Bérard, Lyon (P)
• **Germany**	University Hospital Erlangen (Br)
	Universitätsklinikum Schleswig-Holstein, Lubeck (H&N)
• **Netherlands**	Academic Medical Center, Amsterdam (multiple) Leiden University Medical Center (G and R) Radiotherapy Group Arnhem/Rijnstate Hospital (Bl)
• **Poland**	Greater Poland Cancer Center, Poznan (P)
• **Spain**	Catalan Institute of Oncology, Barcelona (Br, G, University Hospital La Fe, Valencia (S) Dr. Negrin University Hospital Las Palmas (P)
• **United Kingdom**	Addenbrooke's Hospital, Cambridge (P) The Christie, Manchester (S) St James's University Hospital, Leeds (P)

*Bl = Bladder, Br = Breast, G = Gyn, H&N = Head & Neck, P = Prostate, R = Rectum, S = Skin

○ BA Educational center in development



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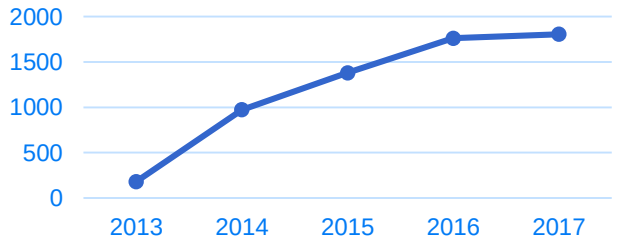
BrachyAcademy website (launch April 2013)

- 1805 'My Academy' registrations from 100 different countries:
  - 1167 spontaneous registrations
  - 480 via workshop registrations
  - 158 Elekta colleagues
- 5 workshops open for registration (10 workshops planned)
- 36 Educational Centers
- 400-plus items in e-library
- 39 BrachyTalk interviews
- English, Spanish, Chinese (Mandarin)

Nr. BA registrations cumulative



BA registrations (total 1805)

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BrachyAcademy in development

- Visit, talk with and select Centres of Excellence for (domestic) peer-to-peer training purposes
- Visit, talk with and select Centres of Excellence to become Workshop sites
- Facilitate training of Radiation Oncologists and Physicists to become ‘proctor’, helping other centres to start Brachytherapy