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Société belge d'infectiologie et de microbiologie clinique
Belgische vereniging voor infectiologie en klinische microbiologie

Out of hospital parenteral antibiotic therapy (OHPAT): a Belgian perspective

Hurdles towards implementation

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Objective of OHPAT

Safe and effective completion of antimicrobial treatment in the comfortable home or policlinical environment without the discomfort, complications and costs associated with (prolonged) hospitalisation

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Creative interpretation of (over)regulations in order to avoid prolonged unnecessary hospitalisation and increase rational use of means, also for parenteral antimicrobials

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Legal framework

- **Continuation of parenteral antibiotics, started within hospital stay possible, if listed as an option for particular antibiotic, with attestation (medical report + indication of duration and posology) and agreement by advisory MD of mutuality**
  - Meropenem, aztreonam, flucloxacilline, …
  - Certain exceptions: tigecycline, …
- **Situations in which hospitalisation necessary with the single motive of obtaining reimbursement**
  - Rare (but a touch of Kafka?)
  - Oral vancomycin for treatment of recurrent or refractory Clostridium difficile colitis
    - Preparation of oral vancomycin from IV ampoulles
  - Ceftriaxone IM (IV)

Oral vancomycin: rules as for an IV antibiotic: Kafka revisited?

- **First choice in 1st en 2nd episodes (up to the jury?) metronidazole**
- **In severe (hospital setting) and recurrent (not necessarily in hospital) C difficile diarrhea: oral vancomycin**
- **Continuation of oral vancomycin, initiated in hospital, possible**
- **Due to unavailability of strictly oral vanco → preparation using powder for IV administration**
  - Change of route of administration forbidden for magistral preparations
  - Obligatory hospitalisation and delivery through hospital pharmacy

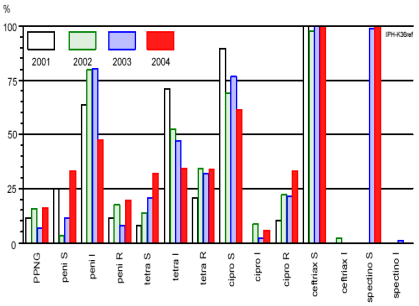
Ceftriaxone in ambulatory practice: current reimbursement criteria

- **Continuation of in hospital initiated antimicrobial therapy**
  - Subacute streptococcal endocarditis without complications
- **Directed therapy of UTI with documented resistance to oral drugs**
- **Lyme disease refractory to initial treatment with doxycycline**
  - Not specified to clinical entities
- **No possibility of purely ambulatory empiric presciption**

Ceftriaxone in ambulatory practice

- **Urethritis**
  - Epidemiologic evolution of FQ resistance in N gonorrheae

Figuur 1 : *N. gonorrhoeae* : gevoeligheid voor antibiotica, 2001-2004



Ceftriaxone in ambulatory practice

- **Urethritis**
  - Epidemiologic evolution of FQ resistance in N gonorrheae
  - Empiric combination of 250 mg (1 g) IM ceftriaxone + 1 g azithromycin (immediate, on the spot treatment in response to higher rates of non-compliance) of clinical urethritis/cervicitis, covering both gonococci + C trachomatis
  - Proposal for reimbursement limited to a single 1 g IM dose of ceftriaxone (to be explored)

Ceftriaxone in ambulatory practice

- **Lyme disease**
  - Oral treatment regimens primary choice
  - Ceftriaxone in disseminated disease, most often requiring diagnostic phase in hospital
  - Amenable problem

Rational use of antimicrobials

- **Oral start with bioequivalent ab**
  - Moxi in CAP 3
- **Early IV → oral switch**
- **PK/PD optimisation of both IV and oral ab**
- **OHPAT**

Current situation (1)

International experiences:

- USA, Canada: guidelines
- Italy, Austria, Netherlands and United Kingdom
- Case series in osteomyelitis, prosthetic infections, infective endocarditis

Advantages

- Possibility to continue work/school
- Increased comfort and ease for the patient
- Limitation of or avoidance of hospital costs
- Prevention of nosocomial infections
- Increased availability of hospital beds

Current situation (2)

Typical infections treated with OHPAT:

- Soft tissue infections
- Chronic osteomyelitis
- Joint prosthesis – infections

Often applied antibiotics OHPAT:

- Ceftriaxone
- Teicoplanine
- Vancomycine
- Meropenem

Antibiotics used for OHPAT in UZ Gent

(data 1/1/2004 - 1/6/2005)

ANTIBIOTICUM	# PATIENTS	%
Amikacine	1	2,27
Cefepime	1	2,27
Ceftriaxone	4	9,09
Meropenem	10	22,73
Oxacilline	3	6,82
Teicoplanine	23	52,27
Temocilline	1	2,27
Vancomycine	1	2,27
TOTAAL	44	100,00

Most frequent infections treated with OHPAT in UZ Gent

(1/1/2004 -1/6/2005)

Pathology	# PATIENTS	%
Joint prostheses – infections	16	36,36
Infection osteosynthetic material back surgery	4	9,10
Catether related infections	3	6,82
Osteomyelitis	5	11,36
Pyelonephritis	2	4,55
Septic arthritis	2	4,55
Lyme disease	2	4,55

Legal framework

- **Continuation of parenteral antibiotics, started within hospital stay possible, if listed as an option for particular antibiotic, with attestation (medical report + indication of duration and posology) and agreement by advisory MD of mutuality**
  - Meropenem, aztreonam, flucloxacilline, …
  - Certain exceptions: tigecycline

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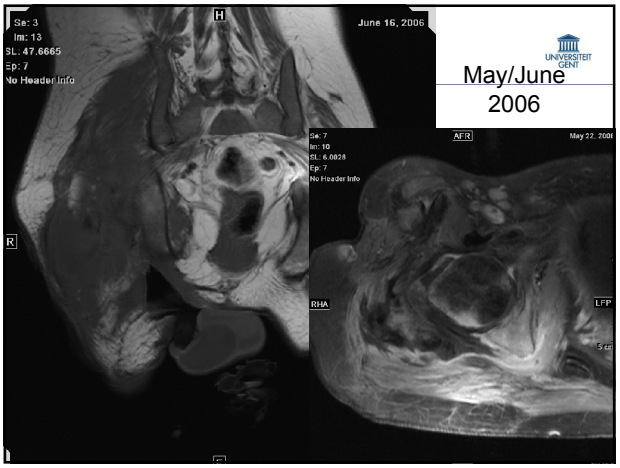
A typical patient

- 1981: Paraplegy (fracture D3-4-5, due to fall off a rock)
- Multiple flap surgery (ischial/sacral decubitus)
- Left-sided total hip prosthesis
- 08/2004: M. gracilis myocutaneous flap reconstruction
- 10/2004: Sacral decubitus with superficial scrotal defect
- Allergic reaction to piperacilline/tazobactam and neuropathy under meropenem
- 2006: Osteomyelitis right hip/proximal femur with skin defect



May/June 2006

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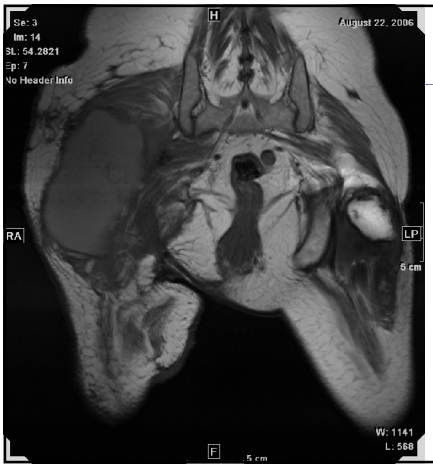
May – Oct 2006:

- Hospital admission: osteomyelitis right hip joint
  + proximal femur + skin defect
- IV vancomycine
- July 2006: total resection right hip (spacer)
- AB switch to teicoplanine & levofloxacine
- Persistent high fever and CRP
- August 2006: removal of spacer



August 2006

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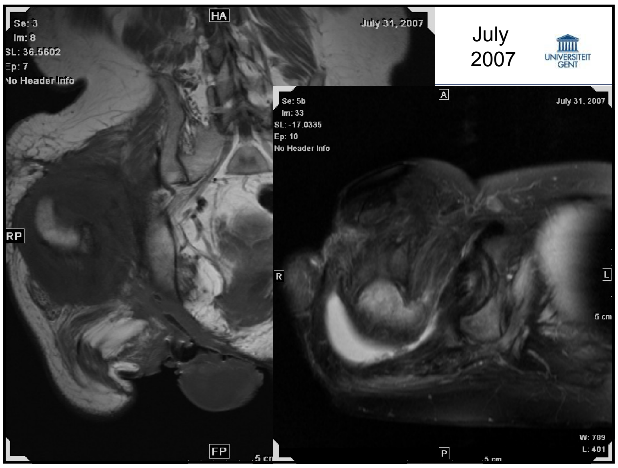
- January 2007: Flap surgery + 2 revisions
- April 2007: Normalisation of inflammatory parameters
  Stop teicoplanine & levofloxacine (after 7 months)
- July 2007: Fever, deeper decubitus + fistulisation
- MRI: Osteomyelitis in tuber ischiadicum, pubis, femur, coccyx
- Microbiology: multiresistant P aeruginosa + coagulase negative staphylococci



July 2007

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Treatment options:

1. Hemipelvectomy vs.
2. Conservative: prolonged suppressive IV Ab

→ Choice for IV meropenem 1g 3x/dag (extended infusion as PK/PD optimization) + teicoplanine 1200 mg 3x/week following loading through PAC

patiëntgegevens
naam, voornaam: ....
UZ adremanummer: ....

voorschrijver
stempel: ....
datum: ....
handtekening: ....

UZ nummer	Geneesmiddel	Aantal af te leveren door apotheek	Posologie	UZ nummer	Geneesmiddel	Aantal af te leveren door apotheek
86706	Azactam 1 G IV-IM (attest verplicht)		.... x. .... G	1920895	Heparine Leo 100 E/ml 10 ml	
86805	Azactam 2 G IV-IM (attest verplicht)		.... x. .... G	2355507	NaCl 0,9% 100 ML Ecoflac Braun	
392750	Glazidim 1 G flacon (attest verplicht)		.... x. .... G	385822	Miniplasco NaCl 0,9% 10 ML	
392651	Glazidim 2 G flacon (attest verplicht)		.... x. .... G	400272	Miniplasco water voor injectie 10ML	
2726985	Ceftriaxone Deltaselect 1 G injectieflacon (attest verplicht) Voor IV gebruik: oplossen met 10 ML water voor injectie (apart aanduiden op dit blad) Voor IM gebruik: oplossen met 3.5 ML Linisol 1% (apart aanduiden op dit blad). LINISOL NOOIT IV TOEDIENEN!!!!!!!		.... x. .... G	6464554	Portacath naald 20 G x 38 mm gebogen	
2727084	Ceftriaxone Deltaselect 2 G IV flacon (attest verplicht) Voor intraveneuze infusie over min. 30 minuten: oplossen in 50 à 100 ML NaCl 0.9% of glucose 5% voor injectie		.... x. .... G	2010769	Portacath Gripper 19Gx 25 mm	
164306	Meronem flac 500 MG IV – infuus (attest verplicht)		.... x. .... G	6465544	Portacath Gripper 20Gx 19 mm	
				6465742	Portacath Gripper 20G x 25 mm	
				1546258	Portacath Gripper 20G x 32 mm	
				6465841	Portacath Gripper 22G x 19 mm	
164603	Meronem flac 1 G IV – infuus (attest verplicht)		.... x. .... G	6465940	Portacath Gripper 22G x 25 mm	
911701	Targocid flac 200 MG poeder (attest verplicht)		.... x. .... G	6464752	Portacath 22 G x 38 gebogen naald	
911996	Targocid flac 400 MG poeder (attest verplicht)		.... x. .... G	640693	Portacath 22 G x 38 rechte naald	
186276	Linisol 1% 10 ML ENKEL INTRAMUSCULAIR TOEDIENEN, NOOIT INTRAVENEUS!			9004469	Infusieset Perfupack (ref EMC3320M)	
				6907487	Afsluitdop combi LL rood	
				7723673	BD spuiten luer 5 ML	
				7723871	BD spuiten luer 10 ML	
				7724069	BD spuiten luer 20 ML	

PRODUCTEN IN GRIJZE KADER WORDEN DOOR PATIENT CONTANT BETAALD IN DE APOTHEEK BIJ AFLEVERING

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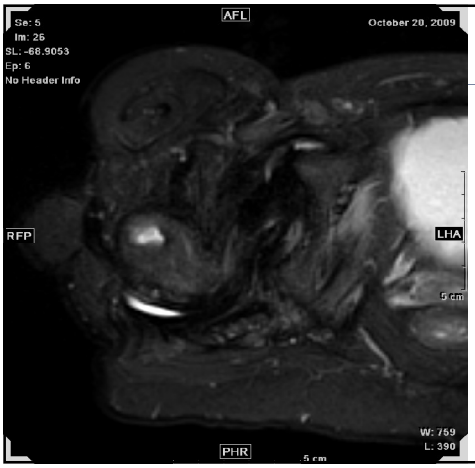

October 2009

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Objective of OHPAT

Safe and effective completion of antimicrobial treatment in the comfortable home or policlinical environment without the discomfort, complications and costs associated with (prolonged) hospitalisation

But: societal vs personal costs to patient?

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FINANCIAL ASPECTS: HOSPITAL-SITUATION VS HOME SITUATION

- **Types of costs:**
  - Hospital stay
  - Farmaceutical costs
    - Antibiotics
    - Infusion fluids
    - Non-reimbursed medication
    - Materials
  - Nursing costs

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Cost estimation: meropenem 1 g tid (30 Days)

Costs	Hospitalisation UZ Gent		Ambulant (hospital pharmacy)		Ambulant (open officina)	
	VI	patient	VI	patient	VI	patient
Hospital Stay	12.231,30	430,17	-	-	-	-
Pharmaceutical costs						
Antibiotics	2.511,90	-	2.323,80	774,90	2.596,50	865,80
Infusion fluids	122,40	-	112,50	36,90	149,40	49,50
D-Medication	-	102,72	-	102,72	-	137,90
Materials	-	-	-	223,03	3,18	244,63
Costs home-nursing	-	-	1.702,58	-	1.702,58	-
Total	14.865,60	532,890	4.138,88	1.137,55	4.451,66	1.297,83
Total treatment	15.398,49		5.276,43		5.749,49	

Cost estimation: meropenem 1 g tid (30 Days)

Costs	Hospitalisation UZ Gent		Ambulant (ziekenhuisapotheek)		Ambulant (open officina)		Day hospitalisation	
	VI	patient	VI	patient	VI	patient	VI	Patient
Hospital stay	12.231,30	430,17	-	-	-	-	2.234,70	-
Pharmaceutic costs								
Antibiotics	2.511,90	-	2.323,80	774,90	2.596,50	865,80	2.323,80	774,90
Infusion fluids	122,40	-	112,50	36,90	149,40	49,50	112,50	36,90
D-medication	-	102,72	-	102,72	-	137,90	-	102,72
Materials	-	-	-	223,03	3,18	244,63	-	-
Costs home nursing	-	-	1.702,58	-	1.702,58	-	-	-
Total	**14.865,60**	**532,89**	**4.138,88**	**1.137,55**	**4.451,66**	**1.297,83**	**4.671,00**	**914,52**
Total treatment	**15.398,49**		**5.276,43**		**5.749,49**		**5.585,52**	

Verbruik medicijnen & materialen

	Totaal	maandag	dinsdag	woensdag	donderdag	vrijdag	zaterdag	zondag
Meronem 1gr	**21**	3	3	3	3	3	3	3
Targocid 400mg	**9**	3	0	3	0	3	0	0
Spuiten Luer Lock 50CC	**24**	4	3	4	3	4	3	3
Spuiten Luer Lock 20CC	**44**	7	6	6	7	6	6	6
Fysiologisch *	**2,08**	0,34	0,27	0,32	0,29	0,32	0,27	0,27
CLC 2000	**7**	1	1	1	1	1	1	1
poortcatheter naald	**1**	1	0	0	0	0	0	0
extensions	**2**	1	0	0	1	0	0	0
afsluitdop	**21**	3	3	3	3	3	3	3
alco swap	**20**	4	3	0	4	3	3	3
optreknaalden	**68**	10	9	11	9	10	10	9

* liter

Kostprijs

	Prijs/stuk	maandag	dinsdag	woensdag	donderdag	vrijdag	zaterdag	zondag
Meronem 1gr **	**5,77**	17,31	17,31	17,31	17,31	17,31	17,31	17,31
Targocid 400mg **	**10,6**	31,8	0	31,8	0	31,8	0	0
Spuiten Luer Lock 50CC	**0,4356**	1,74	1,31	1,74	1,31	1,74	1,31	1,31
Spuiten Luer Lock 20CC	**0,4094**	2,87	2,46	2,46	2,87	2,46	2,46	2,46
Fysiologisch **	**0,3342**	0,11	0,09	0,11	0,10	0,11	0,09	0,09
CLC 2000	**2,8000**	2,80	2,80	2,80	2,80	2,80	2,80	2,80
poortcatheter naald	**4,4900**	4,49	0,00	0,00	0,00	0,00	0,00	0,00
extensions	**1,0600**	1,06	0,00	0,00	1,06	0,00	0,00	0,00
afsluitdop	**0,0601**	0,18	0,18	0,18	0,18	0,18	0,18	0,18
alco swap	**0,0000**	0,00	0,00	0,00	0,00	0,00	0,00	0,00
optreknaalden	**0,0000**	0,00	0,00	0,00	0,00	0,00	0,00	0,00
		62,36	24,14	56,40	25,62	56,40	24,14	24,14
							Per week :	**273,21**
							Gemiddeld per maand (Per week x 52 : 12) :	**1.183,89**
							Huur spuitpomp :	**74,20**
							MAANDTOTAAL :	**1.258,09**

	per week	per maand
** In aanmerking MAF	**217,27**	**941,48**

TOTAAL ZELF TE BETALEN PER JAAR 4.249,29 * vrijstelling maf (450 euro) + (12 X (1258,09 - 941,48))

Depending on vieuwpoint taken

- **Final cost to patient in similar order of magnitude to patient contribution to hospital stay cost (hotel costs)**
  = acceptable
- **Delay in compensation through “maximum factuur” (pre-payment)**
- **Finally, patient still pays to stay out of hospital!**
  = not acceptable (?)

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True hurdles?

- Restrictive regulations
- Financial impact for patient?

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Conditions for ambulatory prescription of antimicrobials for in-hospital use only

- Precision of list of antibiotics/anti-infectives
- Conditions for ambulatory prescription (selected prescribers?), delivery (through hospital pharmacy only or public officina), administration (nurse accreditation, ambulatory care providers?)
- Conditions of prior hospitalisation

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Scope

- Exceptional situations requiring prolonged parenteral therapy, in the absence of oral alternatives
- Vs treatment of relatively frequent infections with conventional regimens as quickly as possible out of hospital (in stable disease)
- Or a mix of both options
- Does not seem expanding field in adult ID vs e.g treatment of low risk febrile neutropenia in children with leukemia (Koester-project, Yves Benoit, Gent)

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True hurdles?

- Restrictive regulations
- Financial impact for patient?
- Lack of organisation in order to fully use possibilities

The way forward

- **Not only improvement of reimbursement or financial hurdles**
- **But also looking for new and less restrictive applications**
- **But also quality improvement through bundling of expertise**
  - Insertion into a more global program of transmural care
  - Contracts between health care institutions, patients, home care nursing (organisations) and ambulatory care providers
    - Total parenteral nutrition
    - Home enteral nutrition
    - IV medication through ambulatory pump
      - Ab in mucoviscidosis
      - Ab in other indications
    - Home chemotherapy through ambulatory pump
    - Home pain therapy (IV, epidural, SC)
    - Complex wound care

Organisational model with role of different partners: reference centre

- **Central contact person (SPOC) for the ambulatory careprovider**
- **Educational check list for each type of treatment in collaboration with provider**
- **Regular patient assessment**
- **Administration for reimbursement**
- **Evaluation of provider service**

Organisational model with role of different partners

- **Hospital or ambulatory pharmacy**
  - Preparation of medications, ready for use
- **Provider**
  - Contact with institution
  - Personalised training of patient and home nurse (service)
  - Evaluation of quality of care of home nurse (service)
  - Logistics: delivery, maintenance material
  - Help desk function
- **Home nursing (service)**
  - Training
  - Delivery of care according to procedures
  - Assessments as prescribed by reference centre
  - Reporting according to preset timing and to coordinator (SPOC)

Organisational model with role of different partners: patients

- **Explicit agreement with home care (incl OHPAT)**
- **Informed consent on realistic therapeutic expectations, treatment modalities, advantages and disadvantages, risks and procedures**
- **Agreement with provider and home nursing (service)**
- **Training in minimal active participation in emergencies**
  - Or self-responsibility
- **Clarity on whom to rely on**

Survey

- **Retrospective or (preferably) one year prospective registration of OHPAT in a range of hospitals (both tertiary or large regional settings)**
  - Antibiotics
  - Indications
  - Societal and patient cost
  - Estimation of LOS (days in hospital) saved
- **BVIKM/SBIMC initiative?**
- **In support of new regulation allowing full reimbursement of OHPAT in selected conditions**
  - Under supervision of/revieuw by infectious diseases services

OHPAT in Belgium: conclusions

- **OHPAT probably unevenly spread as clinical practice, both geographically, in indications and between specialties (adult ID vs pediatrics)**
- **Applied in exceptional situations of chronic suppressive or longer term treatment, in the absence of oral alternative regimens (resistance ± toxicities)**
- **Improvements in organisational models**
  - Integrated approach of home care
  - Streamlining of regulations
- **Patient comfort central (including financial impact)**