

Contents

Contents	i
1 Introduction	1
1.1 Basic principles of positron emission tomography	3
1.2 Use of FDG in oncology	5
1.3 Analysis of FDG PET studies	6
1.4 Tumour delineation methods	8
1.5 Aim of the thesis	10
1.6 Outline of the thesis	10
2 Measuring response to therapy using FDG PET: semi-quantitative and full kinetic analysis	13
2.1 Introduction	15
2.2 Materials and methods	16
2.3 Results	19
2.4 Discussion	24
2.5 Conclusion	29
3 Impact of [¹⁸F]FDG PET imaging parameters on automatic tumour delineation: need for improved tumour delineation methodology	31
3.1 Introduction	33
3.2 Materials and methods	33
3.3 Results	37
3.4 Discussion	42
3.5 Conclusion	46
4 Effects of image characteristics on performance of tumor delineation methods: a test-retest assessment	49
4.1 Introduction	51
4.2 Materials and methods	52
4.3 Results	55
4.4 Discussion	61
4.5 Conclusion	69
5 Assessment of tumour size in PET/CT lung cancer studies: PET- and CT-based methods compared to pathology	71
5.1 Introduction	73
5.2 Materials and Methods	74
5.3 Results	76

Contents

5.4 Discussion	79
5.5 Conclusion	83
6 Measurement of metabolic tumour volume: static versus dynamic FDG scans	85
6.1 Introduction	87
6.2 Materials and Methods	87
6.3 Results	91
6.4 Discussion	93
6.5 Conclusion	98
7 Summary and future perspectives	101
7.1 Summary	103
7.2 Future perspectives	106
8 Nederlandse samenvatting en toekomst perspectief	109
8.1 Samenvatting	111
8.2 Toekomst perspectief	115
9 Thai summary	119
References	131
List of abbreviations	139
Curriculum vitae	143
List of publications	145
Peer-reviewed publications	145
Abstracts	145
Acknowledgements	149
Photo credits	152