To create a safety assurance case for a Generic Patient-Controlled Analgesia (GPCA) system using the Goal Structuring Notation (GSN) in a hierarchy tree format, we will start by identifying the main goal, break it down into sub-goals, strategies, and finally supporting evidence. Below is a simplified version of how such a structure would look:

1. \*\*Top-Level Safety Goal (G1): Ensure the GPCA system safely administers the correct dosage of medication to patients.\*\*

- Strategy (S1): Demonstrate safety through system design, implementation, and operational procedures.

- Sub-Goal (G1.1): Ensure GPCA system design adheres to safety standards and guidelines.

- Evidence (E1): Design documentation conforming to safety standards ISO 62304, IEC 60601.

- Evidence (E2): Safety requirements and specifications review.

- Sub-Goal (G1.2): Ensure implementation adheres to best coding practices.

- Evidence (E3): Code audit report.

- Evidence (E4): Static code analysis report.

- Sub-Goal (G1.3): Ensure the system performs reliably under operational conditions.

- Evidence (E5): System test results including unit, integration, and system testing.

- Evidence (E6): Real-world deployment and monitoring data.

- Strategy (S2): Demonstrate risk management throughout the lifecycle of the GPCA.

- Sub-Goal (G2.1): Identify and evaluate risks associated with the GPCA use.

- Evidence (E7): Risk analysis report.

- Evidence (E8): Failure Mode and Effects Analysis (FMEA).

- Sub-Goal (G2.2): Implement and verify risk control measures.

- Evidence (E9): Design changes documentation.

- Evidence (E10): Verification of risk control effectiveness report.

- Strategy (S3): Ensure user competency and proper use of the GPCA system.

- Sub-Goal (G3.1): Develop and deploy effective training for GPCA system users.

- Evidence (E11): Training materials.

- Evidence (E12): User competency assessments.

- Sub-Goal (G3.2): Establish ongoing support and monitoring system for users.

- Evidence (E13): User support system documentation.

- Evidence (E14): Post-implementation monitoring report.

This example is a simplified version of a GSN-based safety assurance case for a GPCA system. Each goal, strategy, and piece of evidence would need to be detailed further based on the actual system characteristics, design details, risk analysis, and operational data. Additionally, each evidence item would ideally be linked to more detailed documents or systems that provide proof for each claim. This hierarchical structure allows for clear demonstration of how each lower-level goal and piece of evidence supports the overall safety of the GPCA system.